An Exploration of Net-Centric Systems in the Workplace

Elizabeth. M. J. Maxwell

A thesis submitted in fulfilment of the requirements of

the University of East London for the degree of

Professional Doctorate in Occupational Psychology

October 2013

ABSTRACT

Purpose: The purpose of this dissertation is to explore the experience of the net-centric systems (for example Intranet and Cloud) phenomenon that is prevalent in the modern workplace. By understanding this experience, organisations can reconsider existing net-centric systems, and future systems design and deployment can be based on a research based approach.

Design/methodology/approach: This was a mixed method design. The quantitative stream uses statistical analysis on the 117 responses to the self-report survey. For the qualitative stream Interpretative Phenomenological Analysis (IPA) was used on the transcripts of 5 interviews. Quantitative data analysis involved Principal Component Analysis (PCA), hierarchical multiple regression, followed by moderation using PROCESS (Hayes, 2013), and mediation analysis.

Findings: Findings were extensive for both study streams and their triangulation. The quantitative stream found overall psychological well-being improved. There existed an appreciation of technology, that specific job roles experienced negative aspects of ambivalence that related positively to psychological well-being, and that age predicts psychological well-being. The qualitative stream had many findings, such as feeling overwhelmed by the volumes of information, dependency on systems, increased professional confidence and collaboration. Triangulation across studies found the existence of ambivalence, openness to embrace such systems, distraction due to hyperlinks, and manifestations of stress.

Practical Implications: With considerable investment in net-centric systems, finding that psychological well-being is improved by their existence is reassuring for business. As people experience openness and excitement to embrace such

systems, it makes their presence well-received in the main. However, due to the employee's inability to find the information they need, that they are distracted, and feel dependent on such systems, there exists organisational challenges to address. **Value**: As no focused research exists in this area, this study provides exploration of net-centric systems in the workplace, so laying a foundation for further research and application of practical implications of what has been discovered by this study.

Keywords

Intranet, Cloud, Workplace, Computers, Portal, TechnoStress, Attitude, Psychological Well-Being, Distraction, Ambivalence, Dependency, Professional Confidence, PTSI, ATCU, Technology

ACKNOWLEDGEMENTS

There are an incredibly important handful of people who have helped me to achieve this doctorate. There are no words powerful enough to express my gratitude for their support, without which I would have been lost.

I would like to express my sincere gratitude to Bill and Millie Maxwell for installing the belief in me that I was capable of achieving my doctorate, and for all those hours and indeed days, of editing and reviewing. I dedicate this doctorate to them.

Then to John who never said ‘no’ when I asked him to reread something to check it made sense, and always provided me with a challenge on my grammar. John never missed a comma, and even after so many words I probably still place the apostrophe incorrectly, but I am learning.

Without this powerful group of people this work would read a ‘little’ differently. My sincere gratitude for all their patience and unwavering support.

Lastly, to Rob who assisted me with the extensive statistical analysis you will find in this volume. He was always patient, and calm, while addressing all my endless and ‘stupid’ questions. I have learned so much from you, many thanks.

Without the help of these people you would not be reading this dissertation, and for their support I am deeply grateful.

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PREFACE

This research aims to explore the experience of net-centric systems (such as Cloud and Intranets) within the workplace. The objective of this preface is to produce a map of the dissertation by charting the path that this research will follow. The research goal is to present a transparent and repeatable process by providing detail of all aspects of the research process for the mixed methodology harnessed, being quantitative and qualitative methods. In the following chapters the reader will find this account laid out for review in what is intended to be a logical and clear manner.

Our daily usage of computer device technology is pervasive, both personally and within our work environments. Weil and Rosen (1997) state that we would be challenged to function without it. Many companies are deploying more computer systems as central points of communication, in some cases even replacing 'new' ways of communicating such as e-mail. We seem to be creating layers of computer solutions through net-centric system portals that provide access to many different data repositories, organisational applications, blogs and communication feeds and so on. However, do we ever question the impact of these systems on the workforce and their ability to work? This study aims to explore this question by trying to capture the experience of the net-centric system phenomenon, with the objective of further understanding their impacts and implications on employees within the work environment.

The researcher has attempted to provide a coherent view of this research by slightly flexing the traditional framework of a dissertation. Each chapter adds another piece to the picture by drawing on the research background and process, building up the results and discussion, the end point of what we have learned, and the implications and limitations of the current study. Let us understand the chapter sequence and objectives.

Chapter 1 – This chapter aims to highlight to the reader the extent of the pervasiveness of technology in our lives, with particular focus on our particular experience of the business usage of net-centric systems in the workplace, an unexplored area of research to date. As this chapter is serving two masters, being qualitative and quantitative research, it will provide a comprehensive view of relevant literature to date, covering theory and research for both. For the quantitative stream of the study, it walks us through the predominate variables researched in the wider field of Information Communication Technology (ICT) research as determined as capturing aspects of the experience, which it signposts for us as we go. For the qualitative study it highlights an additional dimension of ICT experience that is anticipated as being very relevant to the research in this specific area. It ends by describing the background to the specific corporate net-centric system under study in the quantitative stream. After reading this chapter the reader should have a good grasp of which variables are being studied in the quantitative stream and which are prominent to the qualitative stream that informs the rest of the current research.

Chapter 2 – The researcher employed a mixed methods approach to the current research study. In this chapter the researcher will outline the rationale for this chosen

approach and explain the relevant thoughts on epistemological position. The chapter will also outline the research plan, a parallel design of two streams, being qualitative and quantitative research. Upon completion of this chapter the reader should have grasped the general approach to the study and why this has been selected.

Chapter 3 – As both streams of the study operate based on one ethical and legal framework, the researcher decided to overview this as a foundation stone of the study rather than as disparate parts in the various stream chapters. So, this brief chapter addresses these aspects for the reader to review both the ethical and legal responsibilities of the study and how they were addressed.

Chapter 4 - This chapter outlines the process and results of the quantitative stream of the present study. It details the steps performed from conceptualisation of the study within the organisation and how these steps were then executed. This is the traditional method section of the study. It guides the reader through the data analysis process and then progresses to provide the results of the analysis. It was decided to package the method and results into a single chapter as this represented a logical unit for presentation to the reader. After reading this chapter the reader should understand the research process and appreciate the statistical findings of the quantitative stream.

Chapter 5 – This chapter takes the same approach as Chapter 4, but this time for the qualitative stream of the study. It walks the reader through the method employed, the data analysis, and then proceeds to address the results. After reading this chapter

the reader should be familiar with the research process, and the thematic results of the qualitative stream of the study.

Chapter 6 – This is the last and in some ways the most important, from a real world perspective, as it discusses the findings from the qualitative and quantitative streams, and grounds them in relevant theory and research. After this discussion it moves on to outline the triangulation of the study. Lastly it highlights some limitations, and very importantly for research in the real world, the practical implications of the results to organisations, being the main reason for doing the study.

The researcher hopes that this journey is presented in a way that the reader can easily digest, and that it will provoke thought around their own usage of such systems and the implications for both organisations and further research.

CHAPTER 1- LITERATURE REVIEW

1. INTRODUCTION

It is commonly observed that the pace of modern life is incessantly accelerating, with a dominant catalyst being the pervasive technology we encounter daily driving our 'progress' (Gackenbach, 1998). In the 20th and 21st centuries a major technological agent of transformation has been, and still is, computer-based technology (Cooper, Dewe & O'Driscoll, 2001). It is argued technological 'progression' will improve our lives by bringing knowledge, power, pleasure, personal liberation, and even personal salvation (Brooke & Boal, 1995). Such technology can be found at the operational heart of most businesses, and in turn many employee's work experience.

1.1 Technology as Part of Our Existence

We cannot argue with the fact that technology is an integral part of our daily existence, and that we would be challenged to function without it (Weil & Rosen, 1997). Indeed, 86 per cent of the adult population in the UK use the internet ("National office for Statistics", 2013). Each advancement aims to make life easier. However, this is not always the case, as much technology leaves us alienated, stressed, dependent and incompetent (Weil & Rosen, 1997). Indeed, we seem to be complacent or unaware of the growing evidence that suggests technology will become increasingly difficult to live with (Laura & Chapman, 2009).

When Harold Wilson asked Britain to embrace the 'white heat of technology', his vision was that it would change things for the better. However, whether this is

actually the case has not been satisfactorily answered by research to date (Weinberg & Cooper, 2007). New technology has come to represent a sign of anecdotal progress rather than being factually proven.

Experience of life today involves connection to digital communication, immersing us in an attention provoking environment of visual and auditory information in both our personal and work lives. Indeed, contemporary society is characterised by technologies that 'extend our knowledge, power, experience, and a sense of presence over vast extents of time and space' (Gackenbach, 1998, p. 322). To many people this means they are always 'on' and linked into the pulse of society and work, regardless of locations or time zone (Wallace, 2004).

The tools we use are more than just something to make a task easier. They change the way people think, even how people approach tasks, and can be the catalyst to unimagined wider social changes (Joinson, 2003). As Laura and Chapman state 'we no longer simply use technology; we live it' (2009, p. 292). So, what about our usage of technology in the workplace?

1.2 Technology as Part of Our Workplace

During the last 30 years the importance of information has driven knowledge workers, and the supporting information technology, to the very forefront of organisations (Crespin & Austin, 2002). Technological change within the business environment is typically driven by a technological imperative (Ayyagari et al.2011), which presumes adoption is good and essential to the organisation. Technology is pervasive in the environments of the workplace (Crespin & Austin, 2002). O'Driscoll and O'Driscoll (2010) noted that pre 1990, the application of technology in the form

of information and communication technology (ICT) was typically employed by production and manufacturing companies. However, during the 1990's, there was an exponential growth in the utilisation of ICT, requiring a flexible and responsive workforce suited to the demands created by globalisation of the business environment. Technology of this kind also sits at the heart of global competition (O'Driscoll & O'Driscoll, 2010).

Tarafdar, Tu,& Ragu-Nathan (2011) describe organisational use of information as:

> *'complex, real-time, ubiquitous, functionally pervasive, often requiring users to process information simultaneously and continually from different applications and devices' (p. 304).*

Electronic information is conveyed over a distributed network consisting of many data repositories, operating systems and applications. This is achieved usually through a portal, or application, which can be hosted in the Cloud or on a Local Area Network (LAN). As these terms may be unfamiliar to some they will now be defined.

From an ICT perspective there are various kinds of 'nets', or networked systems, consisting of linked computing devices, such as servers and communication networks. The largest and most extensive is the internet or the 'Cloud'. According to Gartner's Ben Pring the Cloud is a metaphor for the internet, and Knorr and Gurman (2011) highlight that analysts and vendors provide broad definitions of the Cloud such as being any computer system being utilised beyond the organisations firewalls. This is the definition used in the present study, and so 'the Cloud' is referenced rather than using the term 'the internet'. The other 'nets' are those within

the organization itself and typically within the internal security systems, or behind the ‘firewall’. An intranet is an ICT system within a firewalled environment, thus providing security for an organisational internal community. Due to the nature of distributed systems, it is unclear to a user if the information being accessed is internally or externally hosted, that is by the Cloud or Intranet. A Portal is an application that provides a common access point to systems and data, such as an intranet and the Cloud, for work related use. As the study investigates ‘net-centric’ systems the main proviso is that the systems are networked and so both types of ‘nets’ are relevant to the study, being Cloud and Intranet. In this study such portal systems will be referred to as net-centric systems.

These net-centric systems offer access to unequalled quantities of information and knowledge, while being comparatively low cost paralleled with traditional sources (Bakos, 1998). Such systems have had dramatic effects on the ways in which we conduct and support business and there have been turbulent times as we experiment with its potential exploitation. Net-centric systems achieve interconnection between the worlds computing power, communication and electronic systems. Having access to net-centric information creates a powerful extension to our existence as it leads ‘people to pay attention to different things, have contact with different people, and depend on one another differently’ (Sproull & Kiesler, 1991, p. 4). However, finding ways for organisations to capitalise on this information, and create new knowledge, has proven more difficult than initially estimated (Wallace, 2004).

1.2.1 Net-Centric System Adoption

The Cloud began to grow in the 1990's (Kelley-Milburn & Milburn, 1995), and has developed exponentially since 1995. In the UK, 66.4 per cent of the 60.6 million inhabitants have accessed the Cloud ("Internet World Stats", 2008) with 16 per cent originating from the workplace ("Omnibus Survey", 2008). Beyond the UK, data confirms that the majority of American workers use ICT to perform their work, although level and type of use varies by industry and profession (Madden & Jones, 2008). In an Oxford Internet Survey (Dutton & Blank, 2011) usage for informational purposes such as 'look up a fact' was a major reason for going on-line. Schiffman, Sherman and Long (2003) also found that 50 per cent of people use the Cloud for learning or gathering information.

In November 2010, The National Office of Statistics (2010) published that during 2009, 91.1 per cent of UK businesses had Cloud access. For businesses employing over 1,000 people, ICT training was part of standard policy for employees with 85.8 per cent being trained. In small businesses consisting of 10 to 49 people, training was standard for 22.3 per cent of employees ("National Office of Statistics", 2010).

Almost a quarter of businesses, 24.5 per cent, had an intranet system for sharing information with employees ("National office of Statistics", 2011). This type of system was used predominantly by larger businesses with 89 per cent of those businesses with over 1,000 employees using this facility. Businesses continued to provide staff with access to the Cloud, with 6.8 million of those employees surveyed able to access the Cloud at the workplace. Over half of businesses, 50.7 per cent, used the Cloud to complete an administrative task entirely electronically. Once again, it was

the largest businesses that utilised this function the most, 73.2 per cent. The number of people using computers in their work for significant parts of their duties during the day has been studied by Statistics Sweden (1999) showing that in Sweden one third of people at work used a computer for at least 50 per cent of their time. So, as we can see from the statistics business provision of intranets, with Cloud access, is undisputedly pervasive in the workplace. As mentioned the present study encapsulated these systems as net-centric technologies that are targeted to achieve business objectives, and they form the particular focus of the present study.

1.2.2 Net-Centric System Rate of Change

Advancements in computerisation and net-centric technologies such as the Cloud have triggered explosions of innovation that change organisational structures and impact the business landscape (Wallace, 2004). The thrust of new technology has been towards improving the speed and delivery of essential resources (Weinberg & Cooper, 2007). Indeed the flow of information has quickened. As the fastest growing mechanism for electronic markets is the Cloud, this means that organisational performance is dependent on employees utilizing the Cloud and intranets, all part of net-centric system, appropriately (Lee & Kim, 2009). The rate of change is so fast that we often find ourselves in a continual process of adjustment (Fry, 2006). While businesses expand their adoption of technology, and in doing so change the business environment, it is not necessarily the case that people adapt to the same extent (Weinberg & Cooper, 2007).

1.2.3 Net-Centric Systems and Productivity

One would assume, and indeed many organizations presume, that using net-centric systems is a means of shaping productivity. Organisations, indeed, employ and

deploy new technology with the objective of improving efficiency and productivity (Arnold, Sylvester, Petterson, Robertson, Cooper & Burnes, 1998). And, ICT systems are increasingly being sought to improve workplace efficiency and knowledge management (Rizzuto & Reeves, 2007, p. 226). There is considerable empirical evidence that the implementation of ICT in the workplace improves organisational productivity and effectiveness (O'Driscoll & O'Driscoll, 2010). For example, the economic evidence points to a relationship between widespread ICT adoption and workplace productivity gains (Brynjolfsson & Hitt, 2000; Stiroh, 2002; Fernald & Ramnath, 2004; Dos Santos & Sussman, 2000; Kudyba & Diwan, 2002). Organisations also deploy technology with the aim of saving costs (Weinberg & Cooper, 2007).

However, less than half of technology projects have the desired business outcomes (Clegg & Palmer, 1996). Although, some studies have shown adoption of net-centric systems lead to employees feeling that it enabled them to work faster and with less complexity (Cooke & Kroeze, 2004).

There are three main factors that make these technologies very attractive to companies. Firstly, worldwide access through the global address system uniform resource identifier (URI). Secondly, they provide easy integration of different text, graphic, audio and video formats. And thirdly, it is easy to link these resources to each other with hyperlinks (Kaiser, 2000).

1.3 Technology's Impact on the Organisation

Understanding the impact of net-centric systems is a necessity for commercial decision making (Kraut, Kiesler & Boneva, 2002) as it has organisational

consequences. However, researchers argue that the impact of using ICTs is not always evident, and that indeed some unplanned consequences could be counterproductive (Ayyagari, Grover & Purvis, 2011).

Organisations should understand application of these systems to ensure they serve their long term strategies, and shape how they can be beneficial to their employees. The present study aims to understand the experience of business focused net-centric systems within work contexts, with the objective of providing information to support long term organisational strategic decision making that shapes procedures, and so to address both employees and economic interests.

Although information systems are embraced by organisation's empirical data, addressing the psychological effects of its use, are equivocal. Measuring perceptions about the impact of technology on aspects of work is important. Worker's perceptions of their performance, their work demands, and time pressures, predict important organizational outcomes, such as absenteeism and turnover, and are also linked to indicators of physical and mental health (Kurland & Bailey, 1999; Levine & Norenzayan, 1999; Bellavia & Frone, 2005; Duxbury, Lyons & Higgins, 2008).

The BBC (2003) quoted that 9 out of 10 people using computers at work are frequently annoyed by the quality of the technology, such as slow response time and machines crashing. Regarding the implementation of ICT systems, research shows that nearly 50 per cent fail (Aiman-Smith & Green, 2002) are disruptive and lead to cynicism about future implementations (Reichers, Wanous & Austin, 1997). In the

majority of cases according to Huang, Yang, Jin, and Chiu (2004), user satisfaction is still the most prevalent measure to gauge the success of an information system, and the most important as it has psychological impacts.

So, what is the experience of net-centric systems in the context of work? Is their existence experienced as productive, positive and satisfying or is it counter-productive, negative and detrimental? The present study aims to explore and understand this phenomenon within the work context.

As social scientists we need to define what we know from research of these important net-centric systems in the workplace and how we can expand this understanding in the current study. At the moment there is much research investigating ICT, including Cloud, usage as a general category of technology. However, the researcher found no research looking specifically at net-centric systems created by organisations for business usage as a specific subset of ICT research.

The researcher will now outline predominant psychological research in the wider area of general ICT and Cloud usage relevant to the quantitative study variables, and then the qualitative study.

2 PSYCHOLOGICAL RESEARCH - ‘NET-CENTRICITY’

There is limited evidence of a positive association between ICT use and employee’s work-based assessments. Opinion data collected in 2008 indicate that 80 per cent of

workers believe ICT use has improved their ability to do their job (Madden & Jones, 2008), being presumably positive for the employee and the organisation. And 46 per cent of workers believe that ICTs increase demands that they work more hours (Madden & Jones, 2008), presumably detrimental to employees and beneficial to organisations.

Empirically the majority of previous survey research has focused more broadly on the use of ICT generally, or the broad use of the Cloud (Chesley, 2010). Cloud studies have sometimes attended to differences in outcomes associated with the use of various applications like e-mail (Boneva & Kraut, 2002), general information gathering, and engagement in economic activities such as banking or shopping (Meszaros, 2004). More frequently, studies have grouped these activities into a single empirical measure such as 'time spent in the Cloud' (Nie, Hillygus & Erbing, 2002). Most existing ICT related research looks at the existence of technology as nominal rather than the various artefacts of the technology, and their impact on the experience of the work place (Orlikowski & Iacona, 2001). There is a call for research to both disassemble the components of the experience of technology into artefacts and to focus research on formulating understanding of these artefacts and their unintended consequence that may be problematic in usage and engagement (Orlikowski & Iacona, 2001). This is an aim of the present study with its specific focus on business users net-centric technology usage, as the psychological experience of net-centric systems is unknown.

Changes in the experience of the workplace as a result of net-centric usage have received little attention in the wake of the tidal-wave of e-business (Wallace, 2004).

Therefore, as social scientists, we have a responsibility to increase our understanding of the relationship between people and technology, and to support socio-technological development strategies (O'Driscoll & O'Driscoll, 2010). The present study engages with this responsibility.

Most ICT related research is focused on what ICT can do for a person. However, an important question for organisation is 'what technology can do *to* you?' (Ayyagari et al., 2011). Given how pervasive ICT is in our work lives, it is important that its impacts are understood (Ayyagari et al., 2011).

How can we understand the impact of this usage on employees? The next sections aim to review the variables for the quantitative study based on an assessment of what current research has determined as significant, related to existing general ICT and Cloud psychological research. The researcher will build a picture of variables that will be tested for significance in relation to the specific area of net-centric system usage within the workplace. This approach has been taken as it enables the researcher to test if existing findings are echoed when looking at this specific phenomenon. The researcher will now outline the most relevant variables from existing research as being psychological well-being, TechnoStress and attitude.

A psychological construct that has been used in general ICT research is that of 'psychological well-being' as indicative of our psychological health in relation to the experience of technology. The concept of psychological well-being related to technology will now be discussed.

2.1 Psychological Well-Being

In 1998, the American Psychological Association presidential address called for the creation of Positive Psychology, being research focused on well-being and optimal human functioning (Seligman & Csikszentmihalyi, 2000; Snyder & Lopez, 2002). Theories of psychological well-being are derived from an eudaimonic approach. This focuses on the extent that a person is considered to be 'fully functioning' as reflected by personal growth and achieving meaning in life (Ryan & Deci, 2001).

If we look at the workplace and exclude accidents and hazardous working conditions, we find that psychological well-being presents as an important variable as a determinant of success that is directly impacted by the work environment (Robertson & Cooper, 2011). Why is ensuring that employees are in a state of psychological wellness important to organisations? Let us now explore the impact of positive psychological well-being in the workplace.

2.1.1 Psychological Well-being in the Workplace

A sizable amount of research in organisations has found significant relationships between higher psychological well-being occurring in their workforces and their ability to achieve better economic results (Roberston & Cooper, 2011; Lyubomirsky et al., 2005). This is a consequence of better mental health through a positive view of coping with distress and better immune system functioning (Robertson & Cooper, 2011), and the resultant increase in individual productivity (Diener & Seligman, 2004; Donald, Taylor, Johnson, Cooper, Cartwright & Robertson, 2005; Harter, Schmidt, Kilham & Agrawal, 2003). Wright and Cropanzano (2000) also showed correlations between psychological well-being and job performance, and that psychological well-being predicted job performance better than job satisfaction.

Another impact of increased psychological well-being was established by Harter et al. (2009) who found that it encourages engagement, resulting in increased work performance. Moliner, Martinez-Tur, Ramos, Peiro and Coropanzano (2008) found that staff with higher levels of well-being were willing to 'go the extra mile'. A further impact is that staff well-being is also positively correlated to customer satisfaction (Leiter, Harvie & Frizell, 1998; Dorman & Kaiser, 2002). People who have psychological well-being possess psychological capital having optimism, resilience and belief in their own abilities (Avey, Luthans, Smith & Palmer, 2010). All of the above represent characteristics that organizations would see as desirable in their staff (Robertson & Cooper, 2011).

Well-being leads to not only personal happiness, but also positive outcomes for the various societies in which people exist (Lyubomirsky, King & Diener, 2005). Let us not forget that work creates a society of workers. However, what do we know specifically of psychological well-being related to net-centric systems usage in the workplace? There has been much research around ICT usage in relation to psychological well-being over the last couple of decades. However, results have been opposing and varied (Huang, 2010). All studies have focused predominately on Cloud usage, rather than organisational net-centric systems on which the present study intends to focus. The researcher will now overview past research determining some of the positive and negative impacts on psychological well-being of using the Cloud.

2.1.2 Cloud – Social Perspective Positive Impacts on Psychological Well-Being.

As the Cloud is seen as a vehicle for personal progression it would seem rational that it is capable of improving psychological well-being, whether it is at work or socially. Indeed, research into Cloud usage showed significant correlation to psychological well-being, communication, and social-involvement (Kraut et al. 2002).

The vast majority of existing studies investigating the relationship between the Cloud and psychological well-being have done so from a social perspective. Although this study is taking a business perspective it seemed appropriate that existing findings are overviewed briefly.

Much existing social focused research found psychological well-being improvements with Cloud access, with key findings on dimensions such as loneliness, depression, control, and connection with others. Indeed, studies of general Cloud usage have shown that substantial benefits can be gained from just being connected. Cloud access fosters a sense of belonging, as even if a person is not interacting with anyone in the Cloud, there is still an impression of being a member of a group of people with shared interests. This creates a sense of greater social support enhancing personal identity (Bennett & Sani, 2004) and increases feelings of well-being.

General studies have shown that longer term effects of access to the Cloud, and increased usage thereof, improved feelings of social support and psychological well-

being (Skitka & Sargis, 2005; Kraut, Kiesler, Boneva, Cummings, Helgeson & Crawford, 2002).

Some studies have focused on the information availability facilitated by the Cloud. Weiser (2001), using students, found that Cloud usage for goods and information acquisition favourably affected psychological well-being as social integration and connectivity increased.

Some findings from Howard, Rainie and Jones (2001) show that American citizens surveyed felt Cloud access improved the way they worked and their ability to learn new things. However, again this study was not focused on the specific usage of ICT systems within the work environment in support of business objectives.

Although there have been many studies discovering the positive impact of Cloud usage, there are no studies exploring if these same impacts are present when investigating the usage of purpose built net-centric systems in the work setting. Even although we know general Cloud usage can be beneficial, we do not know if this translates to the work environment when using business focused net-centric systems. Is it the case that we experience improved psychological well-being, and all its associated positive outcomes for the organisation when using such systems?

We know that there can be positive outcomes from Cloud usage but there are also negative impacts on psychological well-being of such systems.

2.1.3 Cloud – Social Perspective Negative Impacts on Psychological Well-Being.

Although again the current research was not focused on purely business dimensions of ICT, the following general studies of the Cloud will briefly be overviewed to provide some background as to the negative impacts on well-being.

In a meta-analysis conducted of Cloud usage, considering 40 studies representing a total sample size of 21,258, Huang (2010) found the relationship between Cloud usage and psychological well-being to be small and negative. Indeed, not all studies showed that Cloud usage was positive in its impact on social involvement, and psychological well-being, as time spent on the Cloud is time away from face-to-face communications (Thompson & Nadler, 2002). This is termed the 'displacement hypothesis' (Huang, 2010) and it proposes that online contact replaces required real-life interaction.

Negative effects on social involvement and an increase in depression have been found among Cloud users (Kraut, Patterson, Lundmark, Kiesler, Mukophadhyay & Scherlis, 1998), but these may have been specific to novice users (Kraut et al., 2002; LaRose, Eastin, & Gregg, 2001). For example in adolescents it was found that online contact reduces quality of contact, and in turn it reduces psychological well-being (Valkenburg & Peter, 2007).

A study by Amichai-Hamburger and Ben-Artzi (2003) of age ranges 16 to 58 years old found loneliness in women increased and so their psychological well-being reduced by having access to the Cloud. This study utilised a self-report

questionnaire to capture 85 students who volunteered to participant in the study. The questionnaire measured dimensions such as neuroticism, extroversion, loneliness and Cloud usage against various Cloud services such as gaming, seeking information related to work, studies in general, shopping, and news. The study was not aimed at net-centric business systems, and it did not exclusively involve people within work environments. So, although the findings are related to Cloud usage the focus area of the current study is quite different in target population and environment compared with the Amichai-Hamburger and Ben-Artzi (2003) study.

Small and frequent frustrations when using technology have been shown to create a cumulative negative impact on physical and psychological well-being (Weil & Rosen, 1997). Frustration is often reported in research on ICT (O'Driscoll & O'Driscoll, 2010) and this can have a negative impact on psychological well-being.

With the prevalence of ICT, it may be impossible for workers to escape exposure to it, which can lead to feelings of impotence and reduced mood, impacting feelings of psychological well-being (O'Driscoll & O'Driscoll, 2010). These studies support the growing perception that rapid advancements in technology are leading to more stress in our lives.

A common aspect of the above studies is that they focused on either general Cloud or computer usage. No study focuses on the explicit usage of net-centric systems purpose built in support of a business and used exclusively by the workforce. The researcher aims to investigate the impacts of these purpose built net-centric systems on psychological well-being at work, as a dependent variable in the quantitative

stream of the present study. The research will now continue to outline the remaining independent variables in the quantitative study.

It would seem that stress is a potential consequence of using ICT, and so net-centric systems as they are ICT systems. Let us now turn our attention to stress within the specific domain of technology usage.

2.2 Stress and Technology

Stress as a psychological construct and area of research started in 1956 with the work of Hans Selye (Jex, 1998). There has been much research in this area since the late seventies. Due to the complex nature of the phenomenon, understanding still requires development. However, even after saying this, occupational stress is very much in the minds of organisations and is cited as the largest problem in the British workplace (Talkheath Partnership, 2013). It is estimated that the cost of stress to the British economy is £3.7 billion per year, with in excess of 13 million employees at risk from the mental issues as a result in the workplace (Talkhealth Partnership, 2013). When people are stressed, but carry on working, it leads to reduced concentration and ineffective decision making. This state of 'stressed' and still in attendance at work is called 'presenteeism', and it is estimated to cost the British economy £15.1 billion per year in decreased productivity (Talkhealth Partnership, 2013).

2.2.1 Stress and Technology – Theoretical Perspective

Stress can be viewed as a stimulus definition, where it is defined as 'stimuli' in the environment, requiring an adaptive response on the part of an employee (Jex, 1998). A response definition understands stress as the feelings that are experienced when the job demands exceed a person's ability to cope (Jex, 1998). Strain is the

resultant negative way in which an employee responds to stressors. Strains tend to manifest mentally, physically and behaviourally.

There are a few theoretical models conceptualising the construct of stress. McGrath's process model (1976) may be of particular interest in this research. Figure 1.1 outlines this closed loop process. This model starts with a 'situation' that is cognitively appraised, then is perceived by the individual in order that a decision can be made of how to respond. The last item is the selection of a behaviour seen as appropriate to deal with the situation at hand.

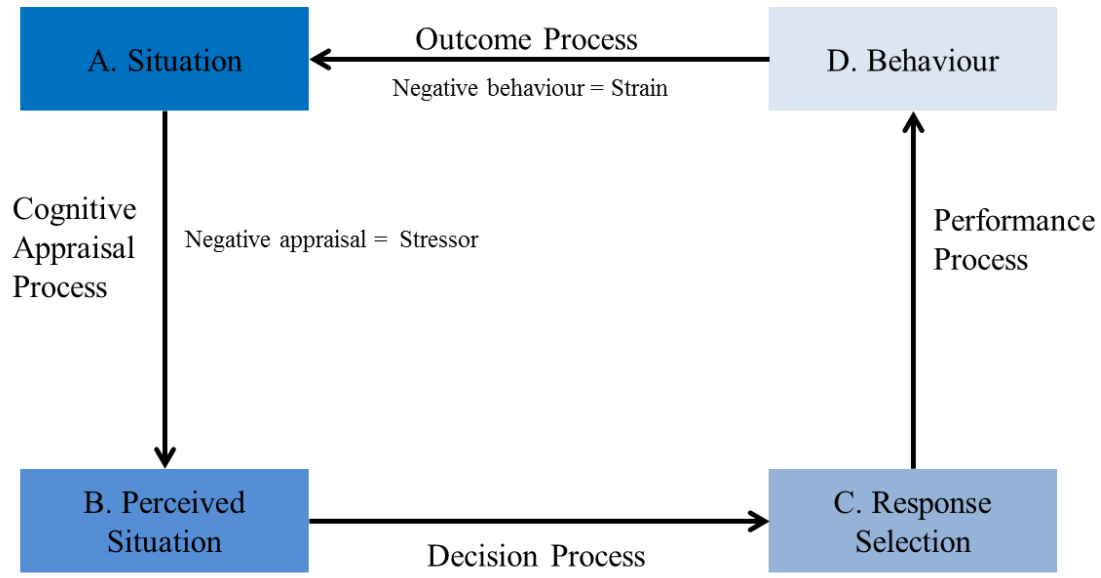


Figure 1.1. Schematic representation of McGrath's process model of work stress.

In the work environment this theory has significant implications for performance. If a stressor is perceived an employee may select a behaviour that undermines their job performance (Jex, 1998). According to Beehr and Bhagat (1985) stressors are often linked to an individual's uncertainty as to whether their efforts will lead to an increase in job performance, which in turn lead to a personally valued outcome.

There is no doubt that the workplace has changed with the advent of the Cloud. For example the Cloud transcends time zone boundaries being 100 per cent available by nature, and provides an equally constant connect to others regardless of place or time. Additionally, change is rapid and relentless, with people within the work environment experiencing new or evolving software within precipitously changing, both technically and business operational conditions, resulting in stress (Arnetz, 1997). Indeed research has determined that the pace of change is at a rate quicker than people can adjust to with comfort (Pascarella & Zellars, 1999), and so creates potentially stressful conditions at work through usage.

With rate of change in mind, Karasek's (1979) theory of stress is important to consider. This model relates stress to situations in which the employee has high demands placed on them but has little control over these demands, called job decision latitude. A need for perceived control within an environment is nothing new to behavioural science literature (Averill, 1973; Cooper, Dewe & O'Driscoll, 2001). Feelings of control are important in the workplace with employees suffering stress when they lack a sense of control (Spector, 1986). In the modern day workplace the adoption of technology is not a decision made by employees, but a modern tool of the job (Weil & Rosen, 1997), hence there is little control over adoption.

As outlined, the rate of net-centric system change is high, with software changes at least every two years (Brillhart, 2004). Also, demand for attention is high with employees being interrupted at least three times an hour by technology (Brillhart, 2004). A high demand and low control environment may result in negative feelings

of apathy, tension, depression and alienation (Salvendy, 1972) and their related negative impacts on psychological well-being, as well as job performance. Stress encountered in the workplace is linked to both health and quality of life challenges (Cooper, Liukkonen & Cartwright, 1996; Tennant, 2001), so reducing stress will reduce absenteeism (Ayyagari et al., 2011). All of these discussed factors are important to organisations and should be further understood by occupational psychological research.

We have discussed some theories of stress that are relevant in the workplace. Now let us consider stress experienced when using ICT systems.

2.2.2 TechnoStress

In order to encapsulate a term for this new factor in people's work lives, Brod (1984), a clinical psychologist, created the term 'TechnoStress'. He described TechnoStress as a modern disease of adaption caused by an inability to cope with new computer technologies. This terminology has been adopted in stress research by many. Arnetz & Wikholm (1997) have used this term to account for the arousal, mental and physiological, detected in people entrenched in technology in the workplace. Tarafdar et al. (2011) referred to TechnoStress as a 'failure to cope' with role demands of computer usage within organisations. A similar term was described by Johansson-Hiden, Wastlund and Wallin (2003) known as ICT stress, related to stress resultant from using ICT and experiencing interruptions, time pressures and technical problems (Johansson-Hide, Wastlund & Wallin, 2003). Let us now explore what we understand of TechnoStress in the workplace. From the limited studies that have been conducted, again, all look at the general usage of ICT or Cloud.

2.2.2.1 TechnoStress Impact on the Organisation

An organisation's effectiveness is largely dependent on the performance of its employees (Campbell, 1990). Thus, organisations should facilitate conditions supporting job performance (Jex, 1998). However, general research into workplace computerisation found it resulted in workers suffering higher levels of stress (Kinman & Jones, 2005; Korunka & Vitouch, 1999; Coovert, Thompson & Craiger, 2005).

When TechnoStress is present, studies determined many counterproductive impacts, such as reduced organisational commitment diminished productivity (Weil & Rosen, 1997; Tarafdar, Tu, Ragu-Nathan & Ragu-Nathan, 2011; Tarafdar, Tu & Ragu-Nathan, 2011), decreased work satisfaction (Weil & Rosen, 1997), and diminished organisational and continuance commitment (Ragu-Nathan, Tarafdar, Ragu-Nathan & Tu ,2008).

With so many counterproductive impacts of TechnoStress it is vital to understand if this phenomenon is present in relation to the specific area of net-centric systems. As the reason organisations are implementing such systems is to support the business, and so be productive, rather than create stress with all its mentioned impacts. Some relevant studies will now be outlined.

There are two studies that are relevant to the present research. Firstly, a study targeted at the business ICT user was that of Tarafdar et al. (2011) who surveyed 233 users across 2 U.S. government organisations using ICT as part of their daily work processes. Data were collected using a confidential questionnaire. Findings were that TechnoStress was in existence and that key factors were: information

overload, inability to deal with complexity and uncertainty of ICT, and pace of change in ICT creating insecurity. Other findings were that women, older people and formally educated people experienced less TechnoStress. Although this study focused on business users and provided insight into the dimensions leading to stress, it did so for general ICT business use rather than a specific aspect such as net-centric systems.

Secondly, is the study conducted by Ayyagari et al. in 2011 establishing if the TechnoStress phenomenon existed in a sample of 661 working professionals using ICT. The sample was generated by a market research company who filtered eligibility based on full time employment and ICT technologies. This research represents one of the few studies found that addresses a specific sample of business users, as the present study intends to do. Ayyagari et al. (2001) aimed to understand the technological characteristics that induce stress in working individuals. The research used a questionnaire and all items required completion before submission, as the present study also requires. Ayyagari et al. (2011) found that TechnoStress is experienced by professionals using ICT and that it accounted for 35 percent of the variance of strain across various stressors, some of which were work overload, role ambiguity, and job insecurity. Ayyagari et al. (2011) research started to break down the 'nominal category' of ICT research as either in existence or not, by understanding the causes or TechnoStress. The present study aims to also break down this 'nominal' ICT category with its particular focus on a type of ICT. Previous studies have not studied this area of ICT, being net-centric systems, and whether stress is experienced when dealing with them. As this area has not been

investigated before, the present study aims to explore if indeed TechnoStress is experienced in relation to net-centric systems.

The phenomenon of stress specifically related to using technology within the workplace has not received much attention in research (Ayyagari et al., 2011). The main studies in this context are mentioned above. Indeed Cooper et al. (2001) and Weber (2004) suggest research should investigate stress related to usage and new ways of working as the present study intends to do.

The various theories of stress touched upon in this section on TechnoStress have a shared conceptualisation of stress. This involves encountering a challenging demand, psychological thoughts and behaviours are activated, and then a complex collection of consequences impacting well-being are involved (Kahn & Byosiere, 1992). If we consider our dependent variable discussed in the previous section in relation to TechnoStress we know that the presence of TechnoStress results in a reduced sense of well-being as a result of anxiety from general ICT usage (O'Driscoll & O'Driscoll, 2010). Thus, the researcher will consider TechnoStress as an independent variable in the quantitative stream of the present study with specific reference to net-centric systems. In relation to psychological well-being the following hypothesis has been constructed from the review for testing:

- The existence of TechnoStress reduces psychological well-being.

In studies of stress it is important to understand the person's perception (Jex, 1998), forming part of the employee's attitude to the potential stressor. In the transactional

model of stress the emphasis is on an assessment of the stressor, termed an 'appraisal' (Lazarus, 1966). In this case, perception is defined in terms of an appraisal process involving a primary appraisal where meaning is given to a situation, then a secondary appraisal involves assessment of resources to cope (Cooper et al., 2001). Understanding a person's appraisal, being a belief manifesting as an attitude, could determine the potential stressful impact of the usage of net-centric on psychological well-being. The researcher will now review attitudes in general and specifically in relation to ICT, and the Cloud, in order to build a basis for investigation into this specific net-centric phenomenon in the workplace.

2.3 Attitude

An important consideration of any experience of a phenomenon is the person's set of beliefs, motivations, and anticipated outcomes. In psychology, this represents an internal affective orientation that explains a person's actions (Reber, 1995), termed an 'attitude'. Attitudes are not one dimensional constructs. Indeed, contemporary theory encompasses many aspects, such as cognitive, affective, evaluative and conative (Reber, 1995).

The researcher will introduce a traditional view of attitudes, not specifically targeted at the object of ICT systems, and limited to a consideration of what are regarded as the three main components of attitude, being beliefs (cognitive), feelings (affective) and behaviours (Arnold, Cooper, Robertson, 1998). It is important to understand that attitudes are what Arnold (et al., 1998) considers as evaluative, that is they represent how a person encapsulates a positive or negative stance towards an object. When considering these three evaluative aspects, one can ask the question if they, when in alignment, represent the same thing? The answer is no. These

aspects can be in different polar states, and so not highly correlated while still encompassing an attitude (Breckler, 1984). For example, a person can have a positive affective orientation to their work while simultaneously having a negative cognitive view of various operational aspects such as the bonus structure. The attitude present at the time is dependent on whether a person is operating from an affective or cognitive stance as per the explicit object (Millar & Tesser, 1989). The explicit object in the example was ‘work’ and ‘bonus structure’, representing different levels of object granularity.

If we consider the behavioural aspect of attitudes we understand that this dimension is additionally impacted by both mood and values (Arnold (et al., 1998). This means that although a person many have for example a negative attitude to certain aspects of work, such as being available to respond to e-mails after hours, that they may still respond to such e-mail as they place professional value on being responsive regardless of hour. This may seem like behaviours are at odds with attitudes, and one may wonder if attitudes predict behaviour at all. This is an important question as attitudes are often the target of adjustment in order to shape behavioural change. Early research found that behaviour was only marginally predictive of behaviour (Wicker, 1969). However, the design and generalisation of the early concept of attitude has been questioned (Arnold et al., 1989). There are indeed cases when attitudes have a significant relationship to behaviour, such as when the object in question is specific and relevant, when attitude is potent, and the person possesses complex knowledge about the object (Pratkanis & Turner, 1994). But, if these dimensions are not present can an attitude still predict behaviour? The theory of planned behaviour (Ajzen & Fishbein, 1980) does not require these conditions. The

theory of planned behaviour rather views that intentions coupled with belief in ability, in conjunction with a combination of attitudes and social norms, form a model that predicts behaviour. So, attitude can predict behaviour under the right conditions or as part of a model of interaction.

The researcher will now try to encapsulate this multi-faceted concept of attitude and understand it in terms of psychological research in the specific area of ICT.

2.3.1 Attitude Formation Relative to ICT

Recent research in ICT focuses on diffusion innovation theory (Rogers, 2003) in the formation of attitudes regarding technologies. As Roger's Theory (2003) is specific to innovations, such as net-centric technology, it is an appropriate foundation for this specific area of research. Let us define what is meant in Roger's conceptualisation of an innovation, being an 'idea, practice, or object that is perceived as new by an individual or other unit of adoption' (Rogers, 2003, p. 12).

Attitudes relative to this theory are inherent to complexity innovations (Rogers, 2003) and this means the emphasis on human computer interactions is on the technology rather than on the individual's characteristics (Morris, Gullekson, Brendan & Popovich, 2009). However, an individual's attitude to the characteristics of an innovation, such as net-centric technologies, exerts substantial influence on both their adaption and usage of the innovation.

In the diffusion of innovation framework there are a number of stages of diffusion. This process involves an innovation being communicated through channels, over a

period of time, to the members of a social system (Rogers, 2003). The period of time from first exposure to the innovation through to the establishment of an attitude to the innovation, is called the 'innovation-decision process'. Figure 1.2 depicts how an attitude is formed through the innovation-decision process.

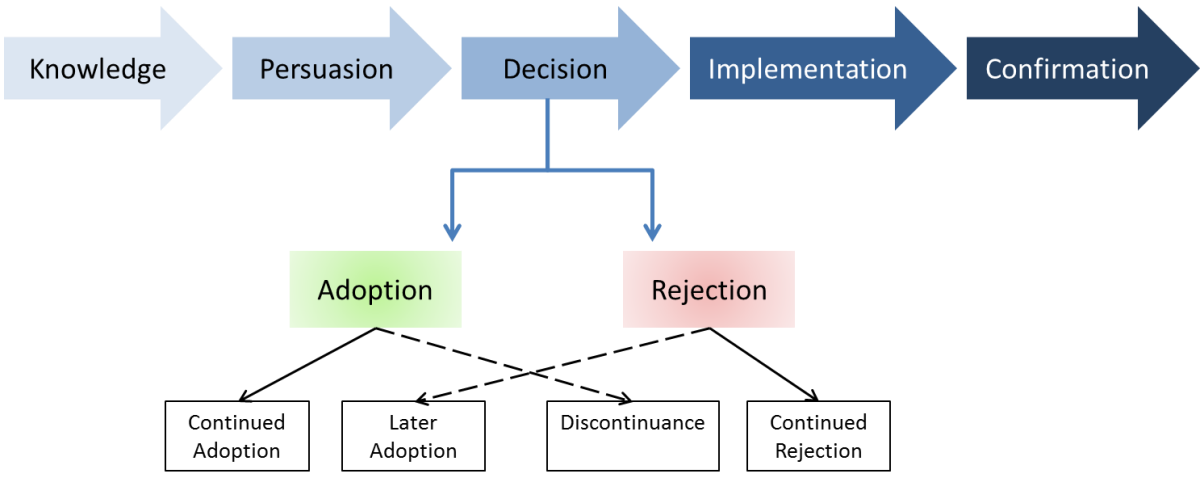


Figure 1.2. A model of the five stages in the innovation-decision process adapted from diffusion of innovation (Rogers, 2003, p. 170).

The formation of an attitude in the diffusion of innovation model involves first gaining knowledge of the innovation and how it functions; this is an active process of seeking knowledge (Rogers, 2003). An attitude is formed in the persuasion stage and then the person reaches the decision stage where activities related to adoption, or rejection, are performed. This is followed by using the innovation, the implementation stage, and then the confirmation stage in which the person again seeks information to reinforce their adoption or rejection decision.

A key consideration of a person's reaction is reflected in understanding their attitude, which in turn predicts behaviour (Fazio & Petty, 2008). This attitude needs to be

understood when exploring people's reactions to ICT, and in turn the psychological outcomes of such usage (Morris et al., 2009) that lead to the adoption or rejection of an innovation and the related organisational outcomes.

2.3.2 Attitude and ICT Systems Adoption

Understanding what motivates people to adopt or reject information technology is both an important and difficult challenge in ICT research (Davis, Bagozzi & Warsaw, 1989). Many studies have shown that attitudes are one of the strongest predictors of behavioural intentions (Ajzen, 2001; Armitage & Corner, 2001; Fazio & Petty, 2008), and a major influence on adoption (Al-Khaldi & Al-Jabri, 1998; Winter, Chudoba & Gutek, 1998; Anderson, 1996). Indeed, studies by Herbert and Benbasat (1994) found that attitudes towards computers determined 77 per cent of lack of usage. Cognitions about computers are significant in determining the performance and contentment, or satisfaction, with tasks involving the computer (Bailey & Pearson, 1983; Rivard & Huff, 1988). Let us explore the impacts of a positive attitude in ICT research.

2.3.2.1 Positive Attitudes to ICT Systems

Research has established that perception of competence leads to positive experience and liking of technology (Beckers & Schmidt, 2003), and positive outcomes of ICT usage (Bessiere, Newhagen, Robinson & Shneiderman, 2006). When people are able to utilise technology affirmatively it has been shown to lead to positive outcomes enabling people to have a sense of mastery, goal achievement and greater efficiency and effectiveness at work (O'Driscoll & O'Driscoll, 2010). Liaw (2002) highlighted that people having a more positive attitude towards computers also have more positive attitudes to Cloud environments, and that experience using

the Cloud predicts both. Cloud experience has been linked with more positive computer attitudes and lower computer anxiety (Durndell & Haag, 2002).

In a study of ICT workers, Beas and Salanova (2004) found that people showing positive attitude coupled with feelings of competence, experienced significantly reduced burnout (emotional exhaustion and cynicism) and less anxiety and exhaustion. ICT research established that competency and control significantly improve psychological well-being (O'Driscoll & O'Driscoll, 2010).

A significant relationship has been established between technological perception and psychological well-being (Vieitez, Carcia & Rodriguez, 2001; O'Driscoll & O'Driscoll, 2010). There is considerable evidence demonstrating the relationship between doubts in a person's ability to cope, and therefore engage with ICT, and the individual's well-being. In summary, most ICT research exploring attitudes found a positive association between attitude and the general experience of using ICT.

However, attitudes toward ICT seem to be two-sided, with many users being generally positive towards ICT and seeing opportunities in using it, but at the same time perceive risks (Gustafsson,Dellve, Edlund, & Hagberg, 2003).

2.3.2.2 Negative Attitudes to ICT Systems.

Some research has shown that indeed, an effect of experiencing ICT at work is an increase in negative attitudes and cognitions, including fear and frustration (Tarafdar et al., 2011).

Tarafdar et al. (2011) surveyed 233 business users from two organisations who used ICT as part of their daily role. ICT usage was typically bespoke systems processing transactions, word processing, and spreadsheet applications. Most participants were middle managers. This study focused on, among other aspects, negative cognitions as influencing ICT satisfaction and performance, resulting in TechnoStress. Findings were that factors such as the uncertainty of upgrades affected perceptions, cognitions of usefulness, accuracy, and ease of use of applications. As cognitions are components of attitudes, ICT stress could be seen as impacting attitude towards ICT usage and engagement for business users. This study differs from the present study in that is focused on middle managers and general ICT type applications. The present study takes all job roles into account and purely focuses on net-centric systems.

Further research determined that experience mitigates feelings of anxiety (Beckers & Schmidt, 2003). However, even when gaining proficiency through experience, attitudes still play an influencing role. Beas and Salanova (2004) showed that attitudes to ICT moderated the impact of ICT training on professional self-confidence, with people having low levels of positive attitude showing decreased professional confidence.

From this review of research into attitudes, in relation to general ICT usage, it would seem that attitudes are important and also impact psychological well-being (O'Driscoll & O'Driscoll, 2010). However, the investigation of the impact of attitude related to net-centric systems in the workplace is unexplored. In support of performing this exploration, the present study will assess the impact of attitudes to

computers as an independent variable in the quantitative part of the current study. In relation to psychological well-being the following hypothesis has been constructed from the review for testing in a net-centric system environment:

- Attitude to computer usage determines psychological well-being, such as a positive attitude to computers resulting in increased psychological well-being

The researcher has now concluded the exploration of the psychological constructs that form the variables for the quantitative study. In summary, the dependent variable is psychological well-being, and the independent variables are TechnoStress and attitude.

The researcher will now progress to outline one further aspect of working with ICT that is expected to be highly relevant to the qualitative study, and is therefore appropriate to mention in this literature review. This is the effect of the magnitude of the information that workers now experience as a result of ICT.

2.4 Information

In today's electronic world, information is doubling every two years (EMC2, 2013). Net-centric technologies offer unparalleled access to terabytes of electronic information (Amichai-Hamburger & Ben-Artzi, 2003), currently estimated at 667 exabytes over the Cloud annually (The Economist, 2010). Electronically stored information is projected to reach 1.8 zettabytes by 2020 (EMC2, 2013). We have lots of information to access. However, how is this experienced?

2.4.1 Needs Gratification in the Cloud

The Cloud is thought to have positive effects on groups and organisations (Sproull & Keisler, 1991). Access through the Cloud, a highly decentralised system, defies regulation (Amichai-Hamburger, 2008) supporting an open culture of information exchange without restriction (Gackenbach, 1998). This means that specialist information is no longer exclusively in the domain of the professional or expert.

The Cloud has increased the general public's access to information and so decreases unmet informational needs (Christensen & Griffiths, 2000), enabling us to shape our world according to these needs (Williams & Edge, 1996). A theory that understands informational access to the Cloud is that of a means of satisfying needs, called 'gratification theory' (Kim & Weaver, 2002). This theory sees people as active participants driven by a set of needs, or gratifications, which are satisfied through engaging with the media (Tewksbury & Althaus, 2000). The individual chooses the media through a partial matching of gratifications and perceptions, or attitude, of what the media can offer. A Stanford University (O'Toole, 2000) study of 4000 Cloud users found the second most frequent activity was indeed, information seeking. Rodgers and Sheldon (2002) echoed this finding in their research, discovering a primary motive for Cloud usage was researching. Weiser (2001) found that people use the Cloud for two primary categories of reasons, being socio-affective and goods and information acquisition that is more utilitarian and practical in nature. We clearly use net-centric systems for information seeking purposes.

2.4.2. Information Anxiety and Overload

Information overload has been termed over the years as Information Fatigue Syndrome (Reuters, 2010) and Data Smog (Shenk, 1997). Data smog refers in particular to information repositories such as net-centric information. ICT systems increase the potential of overload, due to the increased information availability that they facilitate. There is a school of thought that says that electronic media overloads people with too much information as a potential stressor (Christensen & Griffiths, 2000) leading to unhealthy levels of anxiety (Rodman & Fry, 2011), termed 'information anxiety' (Wurman, 1980). Information overload creates challenges when both the quantity and quality of information creates high levels of external stimulation leading to increased fatigue (Thomee, 2007; Yellowlees & Brooks ,1999).

2.4.3. Organisational Experience of Information Availability

From an organisational perspective we have seen equally exponential growth in digitally stored information. With net-centric technologies the boundaries are undefined or uncertain, in that they extend beyond the office walls into the global arena, providing a 'desktop gateway to the world' with far-reaching effects (Wallace, 2004, p. 2). Employees now have access to varying data repositories with, in many cases, duplication and out of date information impacting trust in information (Pitt et al., 2003).

If people are wary of the Cloud, and intranets, facilitation of collaboration and information dissemination (Wallace, 2004), this could pose challenges for employees and organisations that are required to provide and use electronic information.

Within organisations people are predominately engaged in information processing (Amichai-Hamburger, 2008) used for judgement formation, and in turn decision formation that shapes behaviour. Amichai-Hamburger (2008) surveyed 50 web surfers that were categorised as experienced, by profiling the time they spend weekly on various Cloud services. Participants were all volunteers and this study was not focused on business users exclusively. As a result of principle component factor analysis (PCA) one of the factors was that people use the Cloud for what has been termed ‘professional services’, including functions such as messaging for work purposes and gathering information. However, the PCA also determined a factor called ‘social services’ that included general knowledge gathering. So, although the Cloud was used for seeking knowledge, there was not a single factor that encompassed all types of knowledge seeking. This shows not only that the Cloud is used for informational purposes, but that there is a difference in social and professional informational gathering activities when using this medium. It stands to reason that net-centric systems will elicit a particular type of information gathering specific to business purposes.

Wilson (1999) defines these information processing behaviours as the activities we use when identifying our information needs, seeking the information and then using that information. We know the raw materials are there, but Wallace (2004) asks, how do people select what is important? Indeed the very proliferation of data is making it inaccessible (“The Economist”, 2010). Often employees create and distribute information because they can, not because it’s useful to the business, leading net-centric portals to be full of bespoke pages with unmaintained dead ends or links (Waddington, 2006). Alex Szalay in The Economist (2010) says that we need to

consider how we teach industry to effectively engage with the abundance of electronic information we have access to.

Goldhaber (1997) argues that economics is the study of how society uses its scarce resources, but that information is no longer scarce. Are we overloaded with information, with not enough time to read and analyse in order to make efficient informed decisions (Wallace, 2004)? The scarce resource is now people's attention. Indeed, we no longer live in an 'information economy' but instead in an 'attention economy' (Davenport & Beck, 2001) where attention is the new currency of business. The quality of our attention is a vehicle for our effective activity (Gackenbach, 1998) that determines our growth. For employees there is a lot of information to keep abreast of or respond to and 'this extra burden of attention can be intolerable' (Wallace, 2004, p. 287). Next, the researcher will present a study investigating the impact of information overload at a management level.

2.4.3.1. Information Overload in Managers

A study was conducted by Reuters Business Information Services (2010) looking at 1300 managers across United States, Australia, Hong Kong, Singapore and England. This study is highly relevant to net-centric system usage in organisations aimed at business objectives. It showed that 33 per cent reported ill-health as a result of information overload, and 66 per cent reported increased tension and reduced job satisfaction due to information overload (Waddington, 2006).

Reuters (2010) found that managers spend a high percentage of time looking for information. Indeed, 38 per cent of the managers surveyed reported wasting 'substantial' amounts of time just looking for information, and 47 per cent of

respondents said that information collection distracted them from their main responsibilities.

Managers found it difficult to develop information processing strategies. This linked information overload with workplace stress. A further finding was the relationship of information overload with interpersonal tension and loss of job satisfaction. Other effects attributed to information overload were ill-health due to stress, having to cancel private activities to keep abreast of information and being too tired to participate in leisure activities due to processing information.

Managers reported that the technologies deployed for handling electronic information were not a business solution, but instead created a problem in the business. They described the 'M25 effect' of information channels where an increase in lanes, or channels, simply creates increased traffic, not better flow.

A reason cited for the increase in information managers were being exposed to in the Reuters Study (2010) was an increase in business communication through forums such as the Cloud. This study provides a perspective on information usage relative to managers in the workplace. It has taken into consideration mediums such as e-mails as the main focus area of the study. So, although it provides some valuable insight into ICT usage, it does not capture the work experience from multiple job perspectives of the particular usage of net-centric system as the present study aims to do.

More studies are required to understand the impact of this phenomenon of information overload (Gackenbach, 1998) and it's effect on the way we experience life and work (Schroeder & Fry, 2007).

All the research mentioned in the previous sections of this literature review has a few things in common. Firstly, they do not specifically address net-centric systems in a work context. Secondly, none of the studies utilise a mixed methodology as this study will. These two facets alone would make this study unique to psychological research.

This concludes the review of the researcher's coverage of relevant research and literature for both streams of the present study. The researcher will now outline the specific net-centric system that is under study for the quantitative stream of the present study.

3. ORGANISATIONAL NET-CENTRIC SYSTEM PORTALS

In today's business world is it common for organisations to have a net-centric systems for 'business to employee' (B2E) communication, catering for things like bulletin boards, memos and other forms of communications (Sinickas, 2005; Lamb, 2011). Theses net-centric systems act as the primary source where employees go to for work-related documents, company news, and collaboration (Sinickas, 2005). These systems are varied in their abilities and complexity. Some are simple and involve purely document sharing, while others involve interaction with employees, such as collaboration and proactive communication. Many systems facilitate collaboration between employees, called 'employee to employee (E2E)' communication, stimulating interaction and engagement at this level (Lamb, 2011). In recent years, these systems have become increasingly important to their

companies. Substantial investments have been made to provide crucial information and workflows to employees (Bargas-Avila, Lotscher, Orsini & Opwis, 2009). Often intranet systems through portals also link users to the Cloud as a way to utilise external resources.

The present study investigates net-centric systems in a variety of forms. The qualitative study works with no specific permutation of this medium, as the participants are from various organisations. However, the quantitative part of the present study investigates a specific occurrence of a net-centric portal and the researcher will now provide some background for this occurrence.

The company under study in the quantitative stream of the present study implemented a worldwide collaboration and information net-centric systems portal in 2008. It seemed appropriate that this portal is overviewed here providing some background to its conception and deployment, as many of these elements are probably similar in other organisations which deploy net-centric system portals.

This portal formed the central axis for company communication, access to internal and external systems, data repository and collaboration facility. The portal provides access to all employees in all geographical locations and all business units and support functions. It was a completely new way of working for the organisation. Previously, these systems were disparate and communication was through e-mail exclusively. There was also no central repository for information sharing or linked access to Cloud information repositories. The portal was launched with no training of staff and uptake was deemed as slow. In 2010 a further portal was launched as an

information repository which was accessed through the first portal. These portals significantly changed how the company interacted with employees and how employees interacted with each other. It created a momentous cultural change.

As is typical of this kind of deployment in any company, there is a sizable amount of capital expenditure associated with the project. In this case, expenditure encompassed both software and people. Even although the company was a software company, they did not have a product in their portfolio to meet the requirements of this project.

So, the portal was facilitated through purchased external software that was deemed as market leading in collaboration portals and Cloud based, called SAVO (2013). This software claimed that it delivers 'comprehensive applications, enterprise social collaboration software and supported by real world practitioners' (SAVO, 2013).

The other cost was that of personnel. Four people worked on the project for a minimum of 50 per cent of their time, supported by a governance council involving several representatives from the various business units that would meet at least monthly. The project duration was 2 years in total. The programme director for the project said that the project was a 'big investment' to the organisation that is estimated to cost millions of dollars.

Unfortunately, the planned matrix of adoption and assessment of return on investment (ROI) were never implemented. After deployment, the project went into a two year period with no central leadership, due to business restructuring, and this

terminated further planned development and measurement. Again the programme director said that it ‘did not grow as an eco-system’, which is what they hoped would happen, and the deployment team were left feeling disenchanted with the project.

The project was very much driven by technology requirements. These covered items such as structured content, search facilities, management and delivery of the content, methodology, roles, administration, scalability and infrastructure. No requirements directly considered the human factor of using the portal, termed the ‘soft’ requirements in the ICT industry.

4. THE RESEARCH QUESTION

Regarding the study of technology and the psychological implications, Nelson (1990) presses for technology to be studied in a differentiated manner, rather than studying it as a single entity. All existing research overviewed in this literature review does not differentiate the usage of ICT within the workplace from purpose built net-centric systems for business purposes. The present study looks at the single facet of net-centric systems at work. The aim of the present study is a more focused understanding through exploring this specific area of technology and its implications for our work experience. The overarching research question for the whole study question is:

How are net-centric systems experienced in a work context?

As mentioned, this will be addressed in two manners. The quantitative study will investigate the relevance of some of the main findings in ICT research to date to see how it relates to net-centric systems. The resultant hypothesis for exploration are:

- The existence of TechnoStress reduces psychological well-being.
- Attitude to computer usage determines psychological well-being, such as a positive attitude to computers results in increased psychological well-being.

In addition to these variables, ICT research should involve a measure of medium usage (Ayyagari et al., 2011) so this has been added as a further variable to the research. Based on the technological imperative mentioned in this review, which states the adoption of technology is good for workers, the resultant hypothesis to be tested is:

- More frequent usage of net-centric systems lead to increased psychological well-being.

The qualitative study will explore the experience of the phenomenon in a manner that is free from any apriori hypothesis. However, it is anticipated that some aspects of the magnitude of information will be highlighted in the qualitative study as a natural part of the experience. Here the exploration is focused on the level of the main research question, mentioned above.

By exploring this specific area of ICT, business focused net-centric systems, and providing an initial understanding of the impact of these systems implications this

research could shape adoption within work environments. It could also result in new avenues of research into this little investigated, and highly pervasive area that shapes a significant part of people's working experience.

The rest of this work will overview how the study was conducted, the outcomes, and explore these outcomes.

CHAPTER 2 – METHODOLOGY

1. INTRODUCTION

The chapter provides an outline of the methodological considerations of the present study. It presents the mixed methods employed, and the rationale motivating selection, against a backdrop of the researcher's paradigmatic viewpoint, while considering the practical aspects of the present study. This chapter also overviews the relative strengths, and limitations, of the chosen methodological approach.

In summary the researcher utilizes the utilitarian pragmatists approach, and indeed argues that traditional arguments on epistemological paradigms are incommensurable, and there is no need for a dominant coherent theoretical paradigm determining method selection. Reconciliation of paradigms to further the theoretical pursuit of 'what is knowledge' is not the objective of the present study. Rather, is it aimed at providing further understanding of the social experience of net-centric information and the limits of knowledge in this research area. Hence, pragmatism is employed.

Data collection techniques used both a semi-structured interview analysed using the qualitative technique of Interpretative Phenomenological Analysis, and self-report questionnaire analysed by using the quantitative technique of multiple regressions.

2. THE MIXED METHODS METHODOLOGY

The research strategy, being, ‘a general orientation to the conduct of social research’ (Bryman 2001, p. 20) employed by the present study is that of a mixed method approach. This involves adopting both qualitative and quantitative methods, so working with different types of data.

As a consideration of any research project the methodology should be justified and transparent for the critique of the audience. Traditionally, this was achieved by presenting the epistemological standpoint that informs the research that guided the integrity of the research. The research will now turn to the consideration of epistemological standpoint in relation to the present study and the methods adopted.

2.1 Paradigms Related Arguments

A key objection to a mixed methods strategy is that it transgresses Kuhn’s (1963) adopted concept that specific methods are inseparably linked to certain epistemological ideas. Epistemology is concerned with the ‘theory of knowledge’ being a distinction of belief from opinion (Pearsall, 1998, p. 620) and hinges on philosophical or theoretical debate of knowledge (Morgan, 2007). Speaking generally, epistemology refers to the nature, range, attainability and general foundation of knowledge, with reference to its methods of attainment, validity and scope.

Two epistemological traditions have dominated the discussion of mixed method research strategies, being the quantitative approach that is traditionally linked to the positivist paradigm and the qualitative approach to the interpretivist paradigms ("Strathclyde University", 2012). The implication from methods being linked to epistemology is that the data derived from each must therefore be interpreted differently, and so is incompatible in a single study. This leads to the belief that using mixed methods does not enable a 'unified' research strategy due to a lack of meeting point between epistemological positions.

Halfpenny (2005) contends that research methods or strategies are inextricably linked to either paradigm, freeing mixed methods design from conflicting epistemological understandings. Hammersley (2005) expands Halfpennys' argument saying that the extensively debated differences between paradigms is less important than the constant debate would imply and paradigms are merely 'working assumptions' , which is at odds with Kuhn's (1963) view. The link between paradigms and methods is an important element for consideration. Indeed, an alternative view is that there is no basis that there are differences in methods because particular methods are not tied to particular paradigms. It is generally recognised that there are no direct or exclusive correspondences between paradigms, methodology and methods (Bazeley, 2002). Morse (1991) points out that "…research methodologies are merely tools, instruments to be used to facilitate understanding" (p.122) and Halfpenny (2005) also argues that *paradigms are independent from procedures.* As the research is using different methods, the researcher according to this argument can see no reason to not employ this mixed method approach nor that traditional epistemological arguments should be

rationalised as being intrinsically linked to the methods utilised. It is widely acknowledged that social science is conducted within incompatible theoretical frameworks that differ fundamentally in a number of areas, such as perception of the social world of human action and how these elements are comprehended (Halfpenny, 2005). This further substantiates the current research design as it indeed operates within the realms of social science. This is the researcher's rationale for employing a stance of pragmatism in this research. Let us now consider 'pragmatism'.

2.2 Pragmatism

Lincolin and Guba say 'workday scientists rarely have either the time or the inclination to assess what they do in philosophical terms' (1995, p. 117). So, if we must refer to a paradigm as a traditional aspect of a method section, let it be practical and guide our research with less of a divide between qualitative and quantitative methods, and be more of a continuum of how research practises lies between these two extremes (Newman & Benz, 1998). Hence the paradigm of pragmatism became the modern philosophical term of mixed methods research (Greene 2008, p. 8). Pragmatism inverts the selection of method to be driven by the empirical and practical consequences of any idea related to its value or usefulness. The emphasis is on the destination of ideas from a desire to move towards resolution of the challenge under investigation (Bernstein, 1983) rather than expanding or confirming the foundations of knowledge. It centres on 'end results'. Pragmatists rejected epistemological purity of traditional assumptions (Rossman & Wilson, 1985) regarding the nature of knowledge as dynamic concept closely coupled to the problem under investigation, thus, outweighing the importance of the philosophical difficulties in their use (Miles & Huberman, 1994).

Pragmatism released dependence on a single epistemological viewpoint for interpretation, making epistemology a set of tools matched to the problem, rather than the problem matched to the tool. Pragmatism creates a flexible environment where many approaches are possible in a single study, as long as they are linked to the goal of impacting the subject of research (Rorty, 1983) rather than continually addressing enquiry around a single view of reality and its laws of nature (Cherryholmes, 1992). Pragmatism 'propels social research forward when paradigmatic arguments would keep it stuck' (Brannen, 2005, p. 10).

The selection of method is based on practicality, in terms of experience of what works, contextually responsiveness involving understanding the situation in which the study occurs and its constraints, and consequentially that truth is embedded in practical consequence. Thus, according to Miles and Huberman (1994, p. 41):

> "The question, then, is not whether the two sorts of data and associated methods can be linked during study design, but whether it should be done, how it will be done, and for what purposes."

With debate on the value of quantitative versus qualitative methods moderating to a recognition that both have a place, the "real issues", according to Patton (1989, p. 181), have become "methodological flexibility and appropriateness". Methodology must be judged by how well it informs research purposes, more than how well it matches a set of conventions (Howe & Eisenhardt, 1990). The researcher is

interested in what counts for good research, rather than match what counts as orthodox methodology.

2.3 Rationale for Utilizing the Method Appropriate to Research

The researcher aligns with Brannen (2005) and Teddlie and Tashakkori (2003) in that it is preferable to design a study based on a method that 'works best' related to meeting the research questions and the audience, rather than on the basis of theoretical considerations. This is the approach taken in the present study. Teddlie and Tashakkori (2003) call this selection process, 'the dictatorship of the research question'. Mason (2006) advocates for interplay between the various ways researchers perceive the social world, opposed to forcing them into a transcendent approach. This is backed by many research methodology textbooks that advocate sound methodological practice is to choose a method appropriate to the research question (Blaikie, 2000; de Vaus, 2001; Mason, 2002; Cresswell, 2003).

Many contemporary research questions are complex (Plano Clark, 2005) requiring us to completely understand multifaceted institutions of realties. The complexity and pluralism of our contemporary world demands commitment to the usage of multiple methods and the fusion of methodologies (Greene & Caracelli, 1997a, 1997b). Jick (1979) reminds us that mixed methods analysis facilitates the piecing together bits of a puzzle to find answers to questions (Jick, 1979). It follows then that numbers can be employed when they are appropriate and likewise verbal comments where they add value (Bazeley, 2002). The researcher draws inferences through co-ordinating multiple strands of evidence that creates a multifaceted view of the phenomenon under investigation. However, the researcher is the instrument that brings all the

information together, as Smith, Flowers and Larkin, (2009) state “because the inquirer is the instrument, all information flows through a single perspective” (p. 77).

Many researchers believe, including this researcher, that research method is a form of technology, and that any technology is only a means for accomplishing an end (Dzurec & Abraham, 1993) thus, an ‘instrument is an instrument, not an end in itself’ (Strauss & Corbin, 1998, p. 27). As Bryman suggested first in1984 in practice much research is driven by pragmatic assumptions, or what Bryman terms ‘technical’ issues. If mixed methods research is carried out in a technocist way it obviates the need for reflection about methods on the epistemological level (Brannen, 2012).

There is another dimension that relates to the transcendence of paradigms being that mixed methods “tap different domains of knowing” (Mathison, 1988, p. 14) and in doing so encourage representation of different features of knowledge or experience. This tapping into provides a more complete picture by noting trends and generalisations, as well as in-depth knowledge of participant’s perspectives (Creswell & Plato Clark, 2007). This in essence allows us to understand the world on various levels. Such features are the micro level where emphasis is focused on subjective interpretations and perspectives, and the macro levels that are concerned with patterns and trends, and operate at a structural level (Bazeley, 2002) or framework required for general applicability. This researcher aims to understand individuals within a work context requiring conceptual transcendence of both micro and macro levels and this must be supported by appropriate methods (Kelle, 2001).

Reality is multifaceted and the researcher believes that a single version of the truth does not exist and so utilizing mixed methods is better suited to reflecting reality. Differences emerge from different kinds of data, and they tell as much about the subject as any similarities would ("Strathclyde University", 2012). Differences between results symbiotically illuminate each viewpoint providing different levels of enquiry. Micro level results can assist in explaining the macro level and vice versa. Indeed, parallel methods may also be the key to understanding the processes which are occurring (Jick, 1979; Mark, Feller & Button, 1997).

In an age when policy makers demand research which will unproblematically identify 'what works', the notion of incommensurability may serve as a salutary reminder that science is, as Popper (2002) implied, concerned with what does not work, and why. Meaningful research is real world orientated (Creswell & Plano Clark, 2007) and thus, practical in nature. Gephart (1988) states that a multiple view on reality makes us more certain that we have captured the fundamental nature of the subject under study.

The researcher is not interested in researching ideas and their origins, or the ideas that drive the research and the ideals upon which research should be founded as a paradigmatic researcher would be. But rather they are focused on the social world with the aim of research results linked to practical and policy ends (Hammersley, 2000).

For the past 25 years, the major argument supporting the mixed method design is that combining the two approaches create a robust position that counterbalances the

challenges arising from both quantitative and qualitative research (Jick, 1979). The mixed method methodology offers a rigorous methodology by which researchers can not only analyse trends, pervasiveness and results, but also encompasses 'meaning, context and process' (Creswell & Plano Clark, 2007, p. 175). If the researcher were to only execute qualitative methods a statistical generalizability, criticism would be that the results are too context specific and their samples are unrepresentative (Brannen, 2012) . Equally, if the researcher were to employ only quantitative methods, a criticism would be neglect of context (Creswell & Plano Clark, 2007), over simplification, decontextualized, reductionist with reference to generalisations, and unrepresentative of meanings within a specific context (Brannen, 2012). By collecting various data such as interviews, typically qualitative, triangulated with surveys, typically quantitative, the possibility of an overarching bias to the study was greatly reduced (Jick, 1979) thus, forging the strengths and reducing the weakness of only either qualitative or quantitative designs (Bryman, 1988, p. 126).

The larger scale survey provide useful quantitative data about TechnoStress levels, psychological well-being, etc. in relation to using net-centric data, but it cannot explore beliefs and perceptions of exposure to net-centric data. Through using mixed methods, the researcher captures different levels of understanding at both a macro and micro level beyond what a single method can offer. Halfpenny (2005) argues that qualitative and quantitative data are not fundamentally different, in the sense that each involves uncovering layers of *content and context that represents social experiences,* Bazeley (2002) also supports this view by highlighting that surveys and participant observation yield equivalent data.

2.4 Limitations for Utilizing the Method Appropriate to Research

A potential limitation of this research strategy is that the researcher needs to be skilled and experienced in dealing with both qualitative and quantitative data and the appropriate considerations for both (Johnson & Onwuegbuzie, 2004). For example, the researcher needs to be cognisant of applying the appropriate and quite different quality checks for the different data types of the study. Indeed, it is not clear if mixed methods research should have its own quality constructs. At the moment there is no clarity as to what these should be (“Strathclyde University”, 2012).

Quantitative quality concepts typically address validity, reliability and generalizability. However, it is agreed that these should not be applied as measures of quality to qualitative methods (Spencer, Ritchie, Lewis & Dillon, 2003). For qualitative methods the researcher needs to focus on elements such as credibility/ trustworthiness (internal validity) , fittingness (external validity) , and auditability (reliability) (Lincoln & Guba, 1985). These are elements that the researcher needs to take into consideration in the present study and address.

3. DESIGN OVERVIEW

As mentioned, the research strategy employed will be that of a mixed methods triangulation using parallel concurrent convergence model depicted in Figure 2.1.

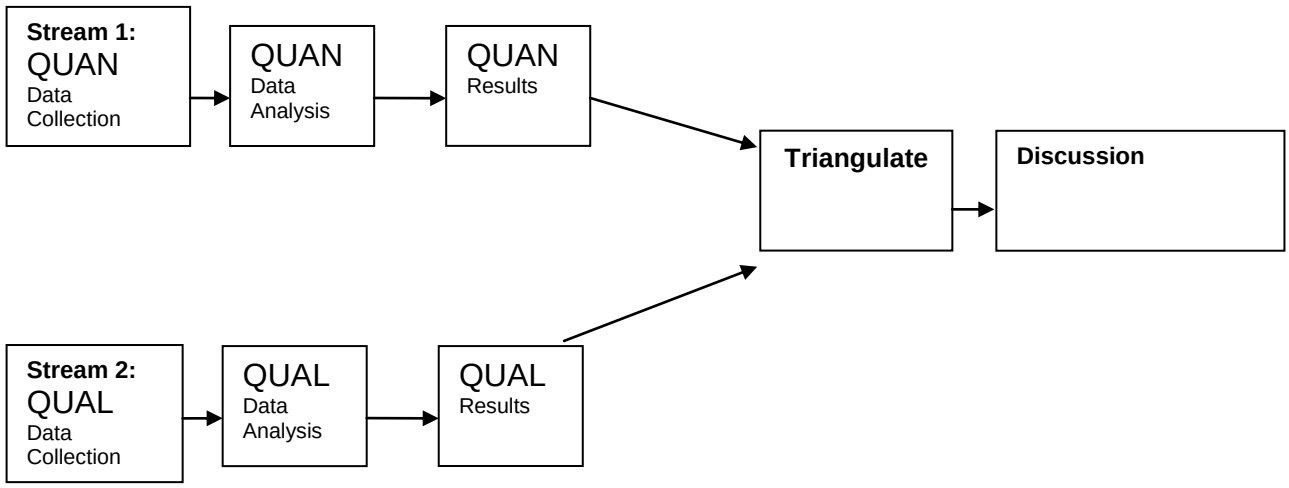


Figure 2.1. Triangulation design: parallel concurrent convergence model.

Figure 2.1 shows the present study mixed strategy is focused on the use of a component parallel design in which the different elements are kept separate and are executed concurrently. Although the different methods might be used simultaneously, a critical aspect is that the questions and procedures used in one are not influenced by what emerges from the other (“Strathclyde University”, 2012). Similar resources are allocated and utilized in equal measure with reference to data analysis and presentation, thus giving them equal weight in the research (Bryman 1988). The rationale for employing a parallel design is that the quantitative study aims to understand if the main findings from general ICT research are also relevant to this specific area of net-centric system research, and so testing if what we know already is also true in this area. Whereas the qualitative study aims to completely understand the phenomenon of net-centric systems beyond any preconceived model of variable interaction, so that the researcher can uncover the micro level of the experience without restriction of apriori hypothesis. Lastly, the findings from each stream will then be triangulated in what Tashakkori and Teddlie (2003) call a ‘meta-

inference', providing a complete picture relative to existing theory from the quantitative study, and also open exploration from the qualitative study. A further strength of this approach is that where triangulation points exist, the micro level view may expand current understanding of the phenomenon and so strengthen overall knowledge in the area. Each stream from the diagram will now be briefly overviewed.

3.1 Stream 1: Quantitative

Data Collection: Self report questionnaire considering all functional areas within an international organisation in response to a new net-centric information sharing portal. *Data Analysis*: Multiple regression testing.

Purpose: To provide a macro level view of relationship between the variables identified as relevant to the phenomenon of net-centric data and check for significant relationships between them in this context.

Feasibility of access to the research population played a determining role in the appropriate research method (Brannen, 2012). As the research population is located over a large geographic area, Europe and the US, it is deemed as difficult to access and so a survey was an appropriate method of collecting data. Another consideration was association with the company under study. As the survey employed proprietary software developed by the company, it was sanctioned due to the fact that they saw it as controllable, and more credible than if non-company owned software were used.

3.2 Stream 2: Qualitative

Data Collection: Semi structured interview of 5 people in various occupations (teacher, musician, debt collector, engineer and IT professional) all using net-centric data in their daily work.

Data Analysis: Interpretative Phenomenological Analysis.

Purpose: To provide a micro level view of the experience of the phenomenon within various organisational settings of net-centric data.

In order to capture this unknown complex social phenomenon, a non-confrontational semi-structured interview approach was appropriate (Brannen & Collard, 1984) to completely understand all psychological aspects in relation to using net-centric data repositories in an occupational setting.

3.3 Triangulate

Broadly the two methods were conceived as addressing complementary aims at both the micro and macro level in order to provide a more representative view of the social phenomenon, an argument detailed earlier in this chapter. The two data sources provide input into the research process of compare and contrast.

The researcher will outline the two approaches in detail with their relevant results in the appropriate following chapters.

CHAPTER 3 – ETHICAL AND LEGAL ISSUES

There are a number of legal compliance issues associated with dealing with any operation concerning personal data, and also ethical issues for consideration with particular reference to conducting research. This chapter will outline these considerations and how they have been dealt with for the entire study. It was deemed appropriate to create this chapter as these issues apply to both the qualitative and the quantitative study.

The remainder of the chapter will outline the ethical considerations, the personal data compliance considerations and how they have been addressed.

1. ETHICAL CONSIDERATIONS

A general ethical consideration is that any study should assess the impact from all participant's viewpoints and any identified threat to their physical or psychological health should be completely removed. Every attempt has been made to eliminate risk to the participants[1]. Data collection methods, interview and survey, were viewed as non-disturbing, and therefore posing minimal risk (Rudestam & Newton, 2001).

When participants were approached they were informed of the aim of the study. All participants were offered a response to any questions they had about the study before proceeding to take part.

[1] It is expected that this study will introduce no new potential hazards or stressors, either mentally or physically, that are beyond those experienced during a typical working day.

By making the purpose of the study evident, and offering to answer any questions about the study, this addressed any issue of deception, or withholding of information, about the nature of the study.

The participant's right to withdrawal was protected, and involved notification to the researcher. Nobody was bound to the research project. All participants were offered the opportunity to have access to the results.

These ethical considerations were addressed in the qualitative stream through discussion and the consent form in Appendix A, and for the quantitative stream by means of a cover letter, see Appendix B.

2. CONSENT

Every individual has been given the right to non-participation in the present study (Coolican, 1999). All participants were of an age whereby they could personally agree to take part in the study. Agreement to participate was explicitly asked and provided prior to involvement. In the qualitative stream the consent form was signed and returned to the researcher; see Appendix A. As the quantitative study was an electronic survey, via an e-mail link, consent was obtained through a clear statement of agreement through the participant's action of proceeding to complete and submit the survey. This approach was taken as the survey engine did not have the ability to store a 'tick-box' type consent as a process step prior to presentation of the survey, and any reply e-mail would remove the ability to remain anonymous. See Appendix C for the explicit statement of consent from the survey tool.

3. CONFIDENTIALITY

Confidentiality was offered on two levels, firstly, at an organisational level, as a proviso it was stipulated that the company must remain anonymous. Therefore, no company name is referenced, nor can any data result in the identification of the company. Secondly, individual confidentiality, which is maintained by desensitising the data through the removal of any personally identifying attribute, and ensuring that any combination of data presented in the results could not collectively identify a participant. For the qualitative data this was achieved through the researcher's intervention, and for the quantitative data this was a function of the survey engine.

4. DATA PROTECTION

The Data Protection Act of 1998 defines conditions by which personal information may be gained, held and utilised. The Data Protection Act stipulates that data subject's information cannot be used for any purpose if it is not associated with the purpose for which it is given. This has been adhered to in the present study.

A further requirement is that data is held securely, and for a period that is no longer than necessary. The data was held on a password protected laptop, and a backup device that was securely stored at the researcher home. The researcher intends to keep the data until the qualification is passed and at that point it will be irrecoverably deleted.

All the above aspects of dealing with data have been adhered to in both streams of the present study.

CHAPTER 4 – QUANTITATIVE STREAM

1. INTRODUCTION

This chapter aims to outline the approach and results of the quantitative stream of the present study that explores a single research question, being:

How are net-centric systems experienced in a work context?

As a result of researching knowledge in this area, represented in the literature review, a number of variables were identified and resultant hypotheses generated, which will be overviewed. However, it is important to be reminded of what is currently understood of this experience, which led to the selection of these variables. So, the chapter will start by providing a summary of variables and the supporting framework of relevant theory from the literature review.

It will then present the rationale for the method selected, participant selection, the process adopted and deployed for data collection and analysis. Following on from this it will present the results achieved from executing the selected method. Let us start by overviewing the variables and theory that form the foundation of the stream.

2. RELEVANT VARIABLES AND THEORY

2.1 Statement of Variables

A number of quantitative variables have been highlighted explicitly within the literature review. All variables investigated are aimed at supporting the research question. In summary, the stream will assess the impact of the independent variables on the dependent variable ‘psychological well-being’ within the workplace. The independent variables are:

1. TechnoStress
2. Attitudes to Computer Usage
3. Frequency of Usage

The initial model of anticipated interaction, supported by the literature review, between the variables is depicted in Figure 4.1.

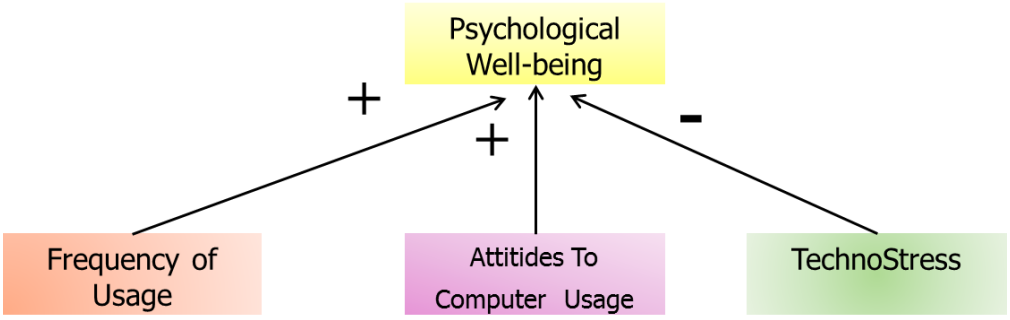


Figure 4.1. Interaction of variables.

The resultant hypotheses according to the Figure 4.1 are represented in Table 4.1.

Table 4.1 *Quantitative Hypotheses Summary*

H_1: The existence of TechnoStress reduces psychological well-being.
H_2: More frequent usage of net-centric systems lead to increased psychological well-being
H_3: Attitude to computer usage determines psychological well-being, such as a positive attitude to computers results in increased psychological well-being

2.2 Relevant Theory

The researcher will now remind the reader of the main research findings and theories informing each of the variable selection.

2.2.1 Psychological Well-being

Psychological well-being is a well-established construct in psychological research, representing the extent to which a person is 'fully functioning' as reflected by a sense of personal growth and meaning in life (Ryan & Deci, 2001). Within the workplace psychological well-being is an important determinate of economic results (Roberston & Cooper, 2011; Lyubomirsky et al., 2005). Having good psychological well-being encourages engagement (Harter et al., 2009), improved job performance and job satisfaction (Wright & Cropanzano, 2000).

From existing studies, on general Cloud usage, we understand that looking for information in the Cloud favourably affects psychological well-being due to the increase in social integration and connectivity experienced (Weiser, 2001).

However, not all consequences are positive. Kraut et al. (1998) discovered reduced social involvement led to an increase in depression. Various other research findings are reported for example that small and frequent frustrations lead to reduced physical and psychological well-being (Weil & Rosen, 1997).

2.2.2 Stress

The construct of stress, and specifically TechnoStress ((Weil & Rosen, 1997) is an important consideration in the workplace. Increased workplace computerisation has resulted in workers suffering higher levels of stress (Kinman & Jones, 2005; Korunka & Vitouch, 1999; Coovert, Thompson & Craiger, 2005). Kraut et al. (2002) found that an increase in specifically Cloud usage, led to an associated increase in stress.

Studies of TechnoStress found reduced organisational commitment and productivity (Tarafdar et al., 2011; Tarafdar, Tu & Ragu-Nathan, 2011; Ayyagari et al., 2011). Other findings captured a decrease in job satisfaction leading to reduced organisational and continuance commitment (Ragu-Nathan, Tarafdar, Ragu-Nathan & Tu,2008; Ayyagari et al., 2011).

Continual changes in technology creates uncertainty in the workplace, with employees not being aware of when the next innovation will be, or the time they will have to adapt (Weil & Rosen, 1997). From a theoretical perspective there are some theories that may inform the existence of TechnoStress.

McGrath's process model (1976) may be of particular interest to this research stream. This model starts with a 'situation' that is cognitively appraised, and

then it is perceived, so a decision can be made of how to respond. Lastly, behaviour, deemed as appropriate, is performed. If the behaviour has a negative impact on the individual then it is called a strain, and could if occurring frequently, impact their ability perform their job role.

2.2.3 Attitude

Much research has shown that attitudes are a key determinate of behavioural intentions (Ajzen, 2001; Armitage & Corner, 2001; Fazio & Petty, 2008), with a major influence over adoption decisions (Al-Khaldi & Al-Jabri, 1998; Anderson, 1996). Herbert and Benbasat (1994) found that attitudes towards computers decided 77 per cent of lack of usage.

A framework that is informative when understanding attitudes is Rogers (2003) diffusion of innovation theory. In the present study 'net-centric systems' are the innovation that people are faced with using in the workplace. An individual's attitude to the characteristics on an innovation exerts substantial influence on both their adaption and usage of the innovation.

Attitudes to computers, in turn, predict a person's attitude to using technologies such as the Cloud (Liaw, 2002). Indeed, a positive Cloud experience is related to the presence of positive computer attitudes and lower computer anxiety (Durndell & Haag, 2002). It has also been discovered that attitudes to ICT moderated the impact of training on professional self-confidence, in that people lacking positive attitude having decreased professional confidence (Beas & Salanova, 2004).

2.2.4 Frequency of Usage

Although frequency of usage is not a psychological construct but rather a parameter it is determined by Ayyagari et al. (2011) as a basic consideration in any research investigating the impacts of exploiting technology. Thus, it forms one of the independent variable of this stream of the present study.

Now that the variables have been stated and their underlying theoretical bases summarised the chapter will move onto detail the method of the study.

3. METHOD

This section will attempt to clearly explain the rationale for the method selected and also the rationale for the participant selection. It will then move onto detail the process adopted and deployed for data collection and analysis in a step by step manner with the aim of providing transparency of the mechanics of the research process. The present stream was conducted in alignment with the ethical and legal framework chapter of this dissertation. First the data collection procedure will be outlined.

3.1 Data Collection Procedure

In order to gain approval for the present study and to reach a point where data was collected for analysis, certain steps were followed, in the sequence presented below:

1. Gain approval in writing from all existing scale developers to use their instruments.
2. Identify participants and gain access to all personnel from various departments across Europe and North America through various conversations and e-mails with the functional managers being: HR, services, facilities, products, information systems, sales, technical support and pre-sales.
3. A survey was assembled from a number of existing scales, then specific portal and self-report usage questions were added.
4. The survey was entered into the company proprietary survey software to which all employees have access.
5. E-mail distribution lists were collated and created for each business unit using MS Outlook mailing lists, and inputted into the company survey engine.
6. Various cover letters were prepared for each manager who approved access to their staff.
7. Cover letters, see Appendix B, were sent to the e-mail distribution lists on behalf of the functional managers, overviewing:
    - 7.1 A statement of purpose for study and perceived interest to the company
    - 7.2 Confidentiality overview
    - 7.3 Link to the survey
    - 7.4 Timeframe for completion
8. Consensual responses were elicited in stages, and will be detailed in the following sections of this chapter.

9. All anonymized responses were exported from the survey engine and imported into SPSS.
10. Scores were calculated as per the scale instructions.
11. Data were analysed using SPSS, as detailed further in this chapter.

3.1.1 Study Approval Challenges

As the net-centric system is an American initiative from senior management, it was thought that a top-down approach was required for the present study. This involved contacting the Senior Vice President and Project Executive Sponsor for the community to obtain permission for the study. At this time the company was operationally structured, by both geographical and functional hierarchies. However, during the present study, the business sustained a fundamental structural change into business units, which invalidated the previous approval and created a period of uncertainty while the company reshaped the management tier. Once this was complete, and the researcher had established working relationships with the new management team, it became challenging to gain new C-level approval for the present study. The researcher perceived that during this period of restructuring people were cautious of running the research. Perhaps it was perceived that the results would not be favourable, as anecdotal feedback indicated the portal was not being adopted. After much pursuit of approval at the executive level the researcher realised that her tactics would have to be adjusted in order to start the present study without further delay. A middle-down type approach was adopted, in which geographical management would be approached for

permission to administer the survey, purely to their geographical and functional groups.

The geographical divisional management were approached for approval to send the survey to their staff, and this was approved. This took some months to achieve as six managers were involved. This process caused significant delay to the project. However, during this time the company underwent significant resizing, shrinking to one third of the headcount. With these factors taken into consideration, this approach resulted in a subset of the original estimated 12,000 staff worldwide, down to 450 potential participants covering most of Europe and one business unit for North America.

The researchers needed to pay particular attention to when the survey should be sent to participants. Factors impacting this were how busy the various sections would be relative to the financial periods that drive the business as a public company. Finally, the survey was sent out mid-financial quarter and mid-month in order to avoid conflict with any business peaks across the functional areas.

3.1.2 Eliciting Survey Completion Challenges

The initial e-mail resulted in around 16 responses. Administering a single survey once should minimise participation attrition and the withdrawal of subjects from the study (Breakwell, Hammond & Fife-Schaw, 1995). However, 16 responses were considered very low, so, a follow up mail was then generated to the same mailing lists a few weeks later. This follow-up e-mail was sent from the researcher directly. This highlighted some problems with

the survey engine e-mail, and probably accounted for the low initial response rate. The e-mail was being categorised by the Outlook system as ‘junk’ mail, and so most people did not receive it unless they looked into their junk folder. The researcher requested that the system was changed then another round of initial cover e-mail and surveys were sent out. This time there were 82 responses. A follow up e-mail, a few weeks, later resulted in a further 19 responses making the total 117, or a 26 per cent response rate. This response rate is in alignment with estimated response rates according to Hamilton (2009).

The initial survey had been piloted on a few people who were asked to ensure items, and instructions, were clear. Feedback indicated that it was clear and that some questions were similar, no adjustments were made. The pilot took 4 weeks and the actual survey took 12 weeks to complete. Cumulatively, the duration was 16 weeks or 4 months once approval was secured.

3.1.3 Using and Processing a Survey

The research design adopted involved a cross-sectional self-report survey, utilising a single developed instrument comprised of various established scales for the individual variables of the research. Using self-report measures of usage is a well-established manner of collection in technology related research (Speier & Venkatesh, 2002).

There are a number of factors limiting access to the participants of the present study that lead to the choice of a cross-sectional survey method, these are:

1. Geographic dispersion of the participants across Europe, Middle East and Africa.
2. Time constraints of the study.
3. Language variance.
4. Cultural differences.
5. Cost implications.
6. Minimising impact to current business revenues.

An electronic cross-sectional survey is the most cost effective way of collecting information from a large number of participants (Breakwell et al., 1995). All employees are expected to be fluent in reading and understanding English. Potential impact on business played a major role in determining the survey timeframe, and the survey instrument kept impact to a minimum by being electronic.

It was decided that responses would be electronically processed, thus reducing the possibility of human error. An advantage of an electronic survey is that responses can be monitored and if all items are not responded to, appropriate error messages can be produced. These features all reduce the probability of participant non-compliance and participants not following the research or survey set procedures (Breakwell et al., 1995).

It is important to note that although these surveys were, in the case of measuring technological related stress (TechnoStress) and attitudes, explicitly directed at technology. However, the psychological well-being (PWB) survey was not explicitly directed at technology. There was no PWB scale specifically dealing with technology. In order that participants responded from a work perspective the instructions asked them to:

> *'Remember when you respond to keep XXXX systems such as XXXX, and XXXX in mind even if they are not explicitly mentioned in the question.'*

3.1.4 Participants

This section will outline the various types of participants of this stream of the study.

3.1.4.1 Company

The company under study sells solution based software tools and methodologies to large corporations with extensive investments in ICT

infrastructures, such as FTSE 100 companies. This company has developed and implemented a net-centric systems portal that has particular dimensions.

3.1.4.2 Working Adults

The target population for the present study is comprised of a number of job functions within a company. All the potential 450 employees were eligible for participation as an entire population sample. It was expected that survey response rate would be low due to a perceived organisational risk as a result of constant headcount reduction and the threat of lack of anonymity, being the perception of being tracked through the usage of company ICT assets (Ayyagari et al., 2011). Random sampling could not be utilised in these circumstances without introducing the probability of Type II errors.

3.1.4.3 Characteristics of the Sample

The unit of analysis is the individual employee. The same software company employs all the participants in the quantitative study. As mentioned the final number of participants was 117, representing a 26 per cent response rate. The study included two principle regions being Europe and North America.

It is important to put into context this research response number compared with similar research. In this exploratory research we need to consider the populations sampled for TechnoStress, psychological well-being and attitude (Attitude to Computer Usage).

Previous TechnoStress Samples: Previous studies using populations of working adults are represented by the following samples sizes: 661 (Ayyagari et al. 2011), 233 (Tarafdar et al., 2011) and 350 (Shu, Tu & Wang, 2011). So, the sample size of respondents is around 50 per cent smaller in this case than other TechnoStress studies.

Previous Attitude (Attitude to Computer Usage) Samples: Previous studies, in professional settings, are widely varied in size. Nkosi (2011) studied 45 nurses, Yilmaz , Aktas, Ozer and Ozcan (2013) studied 133 tax office employees, 108 government employees (Roberts & Henderson, 2000), and 318 technology users (DeYoung & Spence, 2004). In student populations Cazares (2010) studied attitudes in a sample of 200. Relative to these studies the sample size of professionals is in alignment with previous research.

Previous Psychological Well-Being Samples: A meta-analysis conducted by Huang in 2010 indicated a mean sample size of 270, with many studies being around 100 samples similar to the present study. As a large proportion of research related to net-centric systems, such as cloud usage, investigates aspects such as loneliness or specific applications such as children or older adults, general measures of psychological well-being are not usually employed. As this was an exploratory study the researcher decided to use a general measure of psychological well-being in this new area of research, rather than investigating a specific trait like loneliness. This is because it is not known if there are positive or negative psychological outcomes from using net-centric systems.

*The Present Study***:** Respondents to this study ranged in age from 18 years old upwards, with the main sub-populations being age 36 to 40 (19%), 41 to 45 (20%), 46 to 50 (25%,)51 to 55 (21%) and over 55 (15%). In terms of gender there are 15 females (13%) and 102 male (87%) participants. Job roles that responded were representative of administration, finance, information systems, service delivery consultants, sales, technical personnel supporting sales and management. The largest proportion of responses came from a team supporting sales (60%), which is comprised of technicians covering both distributed and enterprise technologies. This profile is representative of the total company personnel profile, with the technical area forming the largest single job function in the company. Other roles reasonably represented were sales (13%), services (9%) and management (14%).

3.1.5 Design

The present study utilises the hypothetico-deductive method that evaluates theories by generating and testing hypothesis (Coolican, 1999). The research design involved the collection of data from one primary source being a cross-sectional survey.

The cross-sectional survey utilises a single developed instrument to assess psychological well-being, TechnoStress, attitude to computers and frequency of usage.

3.1.6 Research Variables

As highlighted, at the beginning of this chapter, the present study aims to assess any significant impact of the independent variables on the dependent variable ‘psychological well-being’. The independent variables are:

1. TechnoStress
2. Attitudes to Computer Usage

As usage is a key factor in assessing the impacts of exploiting technology (Ayyagari et al., 2011) it is proposed as a further dependent variable, termed:

3. Frequency of Usage

The initial model of anticipated interaction is represented by Figure 4.1.

The proposed hypotheses are defined in Table 4.1.

3.1.7 Research Tools

The researcher sought to use existing scales for this study, where such scales existed, being TechnoStress (PTSI), Attitudes to Computer Usage (ATCU)

and Scales of Psychological Well-Being (PWB). The development and characteristics of the measures chosen will now be outlined.

3.1.7.1 Selecting Appropriate Measures

The researcher underwent an extensive review of existing measures. The selected measured will now be presented.

3.1.7.1.1 TechnoStress (PTSI)

The measure utilised in the present study, to measure stress, is the Personal TechnoStress Inventory (PTSI) developed by Weil and Rosen (1997).

For a review of the PTSI instrument development and characteristics see Appendix D. At the time of instrument selection this was the only developed measure targeted at technological stress. All other measures were developed post 2010. As research into technologically induced stress was in its infancy, during the data collection period of the present study, there are no other studies that have tested this instrument. It was decided that this instrument would be utilised in this exploratory study, but that factor analysis would be employed to check components prior to any regression testing.

Administration and Scoring of the PTSI Instrument: The Weil and Rosen (1997) measure is a 47-item self-report measure with seven discrete unit-weighted sub-scales each tapping into a dimension of TechnoStress. The survey administration was standard to all participants being sent out via e-mail, with consent and instructions being handled by the survey engine. Each

item is associated exclusively with a single sub-scale, and either scored or reverse scored according to the item definition. Weil and Rosen were approached to use the scale, and their permission was granted on the proviso that they are informed of results.

3.1.7.1.2 Psychological Well-Being

The measure utilised in the present study to capture psychological well-being, is the Scale of Psychological Well-Being (PWB) developed by Ryff (1989). The instrument was chosen as it provided a general reflection of well-being, rather than being specifically targeted to the application of net-centric systems. Also, importantly for the participants there was a limited item version available. After answering many questions related to PTSI and ATCU it was felt a limited number of questions would be preferable, as it is less intrusive into the working day as a practical consideration of research conducted in the real world (Robson, 2011).

For a review of the PWB instrument development and characteristics see Appendix E.

Administration and Scoring of the PWB Instrument: The Scale of Psychological Well-being 1995 measure is an 18-item self-report measure with 6 discrete 3-item unit-weighted sub-scales each tapping into a different dimension of psychological well-being. The items are 6-point Likert scale as

‘Strongly Disagree’, ‘Disagree Somewhat’, ‘Disagree Slightly’, ’Agree Slightly’, ‘Agree Somewhat’, and ‘Agree Strongly’.

The survey administration was e-mailed with instructions and responses that scored according to the instructions.

3.1.7.1.3 Attitudes to Computer Usage (ATCU)

This scale was selected to capture respondent’s attitude due to the thorough development, multiple testing of the reliability, and updating of the instrument after 20 years of usage. Thus, the reliability is proven to be enduring over a 20 year period, even although there has been much development of computer technologies.

For a review of the ATCU instrument development and characteristics see Appendix F.

Research using the ATCU is extensive in many fields, for example, work situations (Rozell & Gardner, 2000) and medical (Weber,Schneider, Hornung, Wetterling, & Fritze, 2008). In a review of computer attitude scales in 2004 by Shaft, Sharfman and Wu, the ATCU was determined as the only instrument that showed internal consistency and stability.

The revised scale (Morris, et al., 2009) has been employed by Breese-Vitelli (2012) in a comparative analysis of competitive tools in a multinational

company, Baack & Brown (1991) in a study on the difference in attitudes to computers, between 235 younger and 184 older adults, using this measure found an internal consistency coefficient of .84. Although this measure is not the most widely adopted in studies the researcher found that from the handful of developed measures it featured well in research, and the fact that it was created and then updated 20 years later proved the reliability of the scale.

ATCU - Administration and Scoring of the Instrument: The Morris et al. (2009) Revised ATCU scale 22-item self-report measure has 4 discrete unit-weighted sub-scales each tapping into a dimension of the attitude to computers. The items are 7-point Likert scale as 'Strongly Disagree', 'Disagree', 'Slightly Disagree', 'Neutral', 'Slightly Agree', 'Agree', and 'Strongly Agree'.

The survey administration was through e-mail and scored according to the instructions.

3.1.7.2 Data Collection - Final Survey

The final survey was comprised of the measures outlined; PSTI, ATCU and PWB, with the following other items to address the relevant variable collection:

1. *Demographic Questions*: Participants were asked to indicate their age, gender, and job function.
2. *Frequency of Usage Information*: To self-report their frequency of using the portal, options for responses ranged from 'constantly active all day',

'>20 times', '10 to 19 times', '5 to 10 times', '1 to 4 times', to 'Only as a last resort'.

3. *Specific Portal Questions:* Asking various questions around the information presented in the portal, frequency of communication and engagement with the portal.

See Appendix G for the complete and administered survey.

3.1.8 Data Processing

The processing of data will now be outlined as a step-by-step process, so that the study could be replicated if required. Data processing followed the following framework.

3.1.8.1 Step 1: Data Entered into SPSS and Cleaned

Data from the cross-sectional survey were collated into a standardised export, as per the software utilised. Data were desensitised by assigning an identification reference number to each response.

3.1.8.2 Step 2: Data Screening

3.1.8.2.1 Step 2.1 Exploratory Factor Analysis – Principal Component Analysis

Due to these surveys never being utilised in combination, or applied to this research area, it was decided that there was a requirement to check for any inter-correlations between items. Indeed, from some feedback from the completed survey it was felt that similar questions were being asked in the various sections of the survey. Due to these conditions, and as the research is

aimed at exploring the inter-relationships in a set of theoretically constructed variables, a form of exploratory factor analysis called principle components analysis (PCA) was run, in order to establish the validity of the proposed measure. Using PCA would also indicate any duplicity in the factors both inter measure and inter intra item within measures (Pallant, 2003). PCA provides linear combinations incorporating all variable variance (Pallant, 2003). Wuensck (2004) advocates PCA to uncover patterns of inter-correlations and also to test theory about latent variables. The presence of the same underlying construct between measures would make regressions on these variables erroneous. The process of PCA uses various techniques, detailed in Figure 4.2.

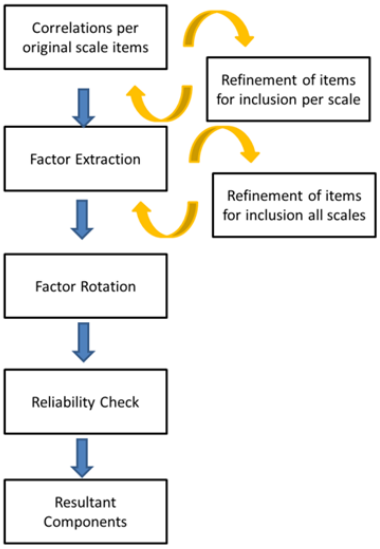


Figure 4.2.PCA Process technique flow.

3.1.8.3 Step 2.2: Descriptive Statistics

Descriptive statistics were processed on the data sample for presentation of means, standard deviations and correlations.

3.1.8.4 Step 3: Main Effects: Regression

Regression analysis is commonly used to test the dependence of a number of factors (Massey, 1962; Churchill, 1979). In this case the dependent construct, psychological well-being, is thought to have multiple predictors represented by the reformulated components and scales. Therefore, an estimation based on the standardised beta coefficients provides an indication of the impact of the predictor constructs on the criterion construct (Brace, Kemp, & Snelgar, 2000). Multiple regressions also produce the multiple correlation coefficient (R) that is the correlation between one variable and a set of predictors (Howell, 1995). Multiple regression answers a number of questions, such as (Feehery, 1993):

1. Is there a linear composite defining the relationship between the predictors and the criterion construct?
2. Is there a statistically significant overall relationship?
3. Which predictors account for the most variation in the criterion construct?
4. If there is a linear composite, how well can the prediction from predictors to the criterion be made?

Additionally, in order to control for shared variance within, and between predictor variables, multiple regression has been selected beyond simple correlational analysis.

3.1.8.5 Step 4: Sub-Effects: Moderation (Interaction) and Mediation

Whereas correlations focus on the 'whether' and 'if' two variables interact, moderation and mediation address the questions of 'how' and 'when' (Hayes, 2013) variables interact. This provides much more information around the circumstances of the interaction (Hayes, 2013) and in an applied field, such as this research, allows us to create better discussions and formulate more concrete implications and interventions as real impacts from a study.

Moderation is a two-way interaction (Field, 2013) between the dependent variables and the independent variable when the interaction is moderated by a third variable, and its characteristics such size or sign (Hayes, 2013). It is used when the researcher requires understanding of the 'boundary conditions for an association between two variables' (Hayes, 2013, p. 8).

All moderation conducted used Hayes (2013) PROCESS, which is an 'add-on' to SPSS, and is very effective in conducting moderation analysis. PROCESS (Hayes, 2013) facilitates easy assessment of moderation by achieving various processes with ease, being:

1. Centring predictors
2. Calculating the interaction variable
3. Creating simple slope graphs
4. Creates and adjusts standard errors for heteroscedasticity

When we turn to mediation, we aim to understand what Field (2013) refers to as the interaction between a predictor variable (X) and an outcome variable (Y), which is explained due to their relationship to an additional variable called

the mediator (M). Mediation is used to address questions around how a causal agent X exerts, or transfers, its effect on Y (Hayes, 2013). Mediation variables are mechanisms through which the independent variable influences the dependent variable.

The next part of this chapter presents the results from employing the outlined process in the first part of this chapter. It will deal with all aspects of analysing the data results.

4. RESULTS

This section outlines the process of working with the data and presents the findings of the data analysis. It will first cover the preparation of the data in order that the hypothesis can be tested. It will then consider the hypothesis in terms of the data and any exploration beyond these hypotheses, as required. All results will be provided, and the section will conclude in a summary of findings in diagrammatic form.

4.1 Data Cleaning

The first step of working with the entered data is to check for errors (Pallant, 2003), as data entry is prone to errors of around typically 5 per cent (Orr, 1998; Redman, 1998). To this end, the data was cleaned using standard techniques such as generating descriptive statistics, and correcting any score errors. Outliers were assessed using techniques such as Histograms, boxplot and particularly the 5 per cent trimmed Mean as recommended by Pallant

(2003), nothing worthy of data manipulation was found during this cleansing process. The data, therefore remains, and was analysed, in its original form.

4.2 Data Screening

The process of data screening will now be detailed.

4.2.1 Item Correlations for Original Measures

The first step of the data screening involved running correlations for the original measures, to remove items that had the majority of Pearson's Correlation Coefficients of under .3 (Field, 2013).

4.2.2 Exploratory Factor Analysis – Principal Component Analysis (PCA)

The rationale for using PCA for this approach is explained in the method section of this chapter. All resultant items, after initial correlations were complete (for PSTI, ATCU, PWB, Portal questions and Frequency of Usage) underwent PCA Factors Analysis utilising the SPSS package version 20. In order to proceed with PCA it is important to establish that the data are appropriate for usage with factor analysis, so, some assumptions were checked.

4.2.3 PCA- Assumptions

Checked assumptions are based on Pallant (2003) and Field (2013). The following characteristics were checked for each of the PSTI, ATCU, PWB and Portal categories of items.

4.2.3.1 Sample Size

In the past, the norm was that larger sample sizes are desirable. However, Stevens (1996) states that contemporary real world research is conducted on smaller sample sizes. Stevens (2002) recommends a minimum of 5:1 cases to variable or factor, and Nunnally (1978) recommends a ratio of 10:1 of cases to factors. The present study, although only providing 117 cases, meets the requirements suggested by both Stevens (1996) and Nunnally (1978), having 7 factors or components. So, sample size is adequate. More reference will be made to sample size in relation to other areas of interest throughout this chapter.

4.2.3.2 Inter-Correlations

Regarding strength of relationship, each inter-correlations matrix indicated that many coefficients were over the recommended .3 (Field, 2013).

4.2.3.3 The Kaiser-Meyer-Oklin (KMO)

This statistic value was .54, indicating that refinement of sampling, or components, was required (Field, 2013). This requirement was addressed during the process that follows.

4.2.3.4 The Barlett's Test of Sphericity (Bartlett, 1954)

This test was statistically significant ($p<.01$), and so the correlation matrix factorability was substantiated.

When conducting PCA there are, it would seem, some incompatible requirements that the researcher must keep in mind; being, the need to create

a simple component model while covering the maximum variance in the sample dataset (Pallant, 2003). So, an approach of many iterations employing experimentation with the factors was taken (Tabachnick & Fidell, 1996).

4.2.4 Factor Extraction

The initial analysis revealed 26 components having eigenvalues above 1 indicating that they should be retained (Kaiser, 1960), this accounted for a total 87 per cent of the variance.

However, upon investigation of the scree plot, it was clearly indicated that there were only 5 components worth pursuing, and by considering Catell's (1996) and Field's (2013) scree test guidance the researcher decided to continue with these 5 components, and their related items for further exploratory extraction (Field, 2013). However, caution is raised when using scree with under 200 samples (Stevens, 2002), so, Kaiser-Meyer-Olkin was used as being indicative of sampling adequacy, and at .54, was regarded as mediocre. So, further extraction was required to reduce the number of variables as it was not possible to gather more samples (Field, 2013).

Various extractions were run, intended to address individual KMOs, as provided by the Anti-Image Matrices, and the researcher gradually removed items with a loading of less than .5, as recommended as a guide for the sample size of 117 by Stevens (2002). This resulted in an acceptable KMO of .71 (Field, 2013). Individual KMOs were also acceptable ranging from .77 to .80. The researcher also checked for values greater than .9 as these reflect multicollinearity, but none was found.

4.2.5 Factor Rotation

Further analysis involved PCA with rotation in order to differentiate between factors (Field, 2013). As there is a theoretical basis (as per the literature review) that these items do correlate, the oblique rotation was more appropriate as it does not enforce an orthogonal (unrelated) approach (Field, 2013). As this data is 'naturally occurring' Field (2013, p. 680) argues that oblique rotation (direct oblimin) is the only practical choice. Also, it must be kept in mind that PCA is being used with the purpose of guiding interpretation, so, the researcher wanted to be open to the data revealing its relationships. This approach was also confirmed by the component plot showing more plots in an oblique rotation quadrant.

A few loadings showed variance across two different components. These were then re-directed to one or the other component, so that all items loaded to *only* one component. This analysis resulted in 5 components being found that accounted for 48 per cent of the variance. The final items were selected in terms of fit using the PCA output, and knowledge, of the subject matter.

The output from the rotations resulted in a configuration of items to components that did not match the original scale measures. So, the researcher conducted some IPA analysis in order to rename the components.

Prior to the reliability test these final components were termed:

1. Ambivalent Orientation to Technology
2. Exasperated Orientation to Technology

3. Portal Orientation to Technology
4. Psychological Well-being
5. Appreciative Embracing Orientation to Technology

4.2.6 Reliability

The components reliability was then checked by investigating Cronbach's α. In this case the 'Ambivalent Orientation' revealed an assumptions violation. This led to the realisation that the component comprised of two scales and not one. The same was also true for Portal Orientation because of the two difference portals involved, as mentioned in the literature review.

The final item adjustment occurred at this stage of the analysis. The researcher used the SPSS reliability output to further remove any items that would improve reliability substantially if they were not present. This resulted in only one adjustment being made to the 'Appreciative Embracing Orientation' increasing its Cronbach from .64 to .77. After final component grouping the Cronbach α's are represented in Table 4.2.

Table 4.2. *Summary of Component Reliability*

Final Components	Cronbach's α	ICC2*	ICC1*
Ambivalent Orientation - Positive to Technology	.91	.68	.16
Ambivalent Orientation - Negative to Technology	.83	.79	.43
Exasperated Orientation to Technology	.82	.80	.23
Portal - Technical Orientation to Technology	.81	.68	.52
Portal - All Orientation to Technology	.68	.75	.37
Psychological Well-being	.88	.84	.24
Appreciative Embracing Orientation to Technology	.77	.75	.34

Note. *Intra-class Correlation Coefficients (ICCA providing a measure of variance accounted for by group membership, e.g. .16= 16%)

All the values in Table 4.2 fall within acceptable tolerance, as per Kline (1999) of over .7, the scale is determined as being representative. As 'Portal – All Orientation to Technology' is under .7 and only has two items Field (2013) raises caution. However, Pallant (2003) outlines that with short scales, fewer than 5 items, when the Cronbachs are low it is preferable to report the inter-item, with a recommended optimal range between .2 and .4. Both these items achieved the optimal range, suggested by Pallant (2003), so reliability is present.

The intra-class correlation coefficient (ICC) is used when investigating the relationship between variables within classes or groups, such as a sample (Friedman, 2005). Common assessments of reliability, in literature dealing

with the multilevel organisations, are the two major types of intra-class correlation (Kozlowski & Klein, 2000). ICC1 in Table 4.2 explains the variance *within* group and ICC2 the variance *between* groups. It can be seen from the table that the reliability in some cases is low for ICC1 (for example 'Ambivalent Orientation – Positive to Technology' only accounts for 16 per cent of variation) but in the majority of cases it is high for ICC2 (ranging from 68 per cent to 91per cent of variance explained). This further supports the reliability of the components (Kozlowski & Klein, 2000) with a current sample size of 117.

A last assessment of reliability within this sample size is referenced by Stevens (2002) with regard to the Monte Carlo study from 1988, which led to guidelines between sample size and factor loadings. Here factors with at least four loadings of over .60 are reliable regardless of sample size. With reference to Table 4.2 it is demonstrated that the majority of components meet this criteria, with exception of Portal Orientation. So, reliability in most cases is proven with the sample size of 117.

In summary the final PCA resulted in new configurations of items across the scales. The following characteristics were in the final PCA, determining the components:

1. The correlation matrix indicated many correlation coefficients with values equal to or greater than .3.
2. The Kaiser-Meyer-Oklin statistic value was .71, a value greater that the recommended .5 (Pallant, 2003; Field, 2013)

3. The Barlett's Test of Sphericity (Bartlett, 1954) was statistically significant ($p<.01$) and so the correlation matrix factorability was substantiated.
4. The 5 components accounted for 48.7 per cent of the model variance.

Table 4.3 represents the final items rotated factor loadings against their components. The results of the PCA promote the usage of the 5 new components and 7 practical scales in the present stream of the study.

4.2.7 Data Screening Implications to Hypotheses

The results from the PCA profoundly impacted the present study. A number of hypotheses had been formulated based on the existing theory, and research, of TechnoStress and attitudes to computer usage. However, the existing measures have, in this particular population, not demonstrated a division of the variables according to the expected scales. This suggests these results are contextually specific to the particular population of the present study. For example, the existing ATCU scale items were split across various new components, and PTSI exhibited the same pattern. However, the PWB scale maintained the highest number of items in a single component.

The only reasonable course of action at this point in the present study was to abandon the theorised hypotheses and return to the level of the research question in order to explore the new configuration of components, new variables, and their resultant interactions with 'Psychological Well-Being'.

Thus, the status of the originally formulated hypotheses is represented in Table 4.4.

Table 4.3 *Summary of Rotated Factor Loadings of Exploratory Analysis*

	Related Factor Loadings						
	Ambivalent Orientation to Technology		**Psychological Well-being**	**Exasperated Orientation to Technology**	**Appreciative Embracing Orientation to Technology**	**Portal Orientation to Technology**	
Item	Ambivalent Orientation - Positive to Technology	Ambivalent Orientation - Negative to Technology				Portal - Technical Orientation to Technology	Portal - All Orientation to Technology
I am comfortable learning new technology.	-.87						
I understand the “language” of technology (e.g., RAM, ROM, virus, gigabytes, server, etc.).	-.85						
I am comfortable with all the new technology that is showing up in my environment (e.g., grocery stores, libraries, gas stations, banks, etc.).	-.80						
I know how to deal with technological malfunctions or problems.	-.79						
I find most technology easy to learn.	-.77						
When technology has problems, I believe they are fixable	-.73						
I feel as up-to-date on technology as my peers	-.68						
Solving a technological problem seems like a fun challenge.	-.61						
When I talk on the telephone I pay attention to the conversation and do not do anything else.	-.50						
I get things done in the time I have planned to complete them.	-.49						
My timesaving devices save me time.	-.46						
I feel that computers limit my creativity.		.79					

I have problems programming computerized items such as cell phones, VCR's and mp3 players.	.76	
When searching for research information, I would rather read books, magazines, and newspapers than browse the Internet.	.71	
Using a computer is too time consuming.	.71	
I have had more bad than good experiences with computers.	.70	
I feel that the use of computers in schools will negatively affect people's reading and writing abilities	.31	
For me, life has been a continuous process of learning, changing, and growth		.72
I feel that having a computer at work would help me with my job.		.70
When I look at the story of my life, I am pleased with how things have turned out		.69
I like most aspects of my personality.		.68
I think it is important to have new experiences that challenge how you think about yourself and the world		.68
In general, I feel I am in charge of the situation in which I live		.66
People would describe me as a giving person, willing to share my time with others.		.65
I am quite good at managing the many responsibilities of my daily life		.63
Some people wander aimlessly through life, but I am not one of them		.63
In many ways, I feel disappointed about my achievements in life.		.63
I gave up trying to make big improvements or changes in my life a long time ago.		.49
Maintaining close relationships has been difficult and frustrating for me.		.45
I have not experienced many warm and trusting relationships with others.		.44

I have confidence in my opinions, even if they are contrary to the general consensus	.42		
I sometimes feel as if I've done all there is to do in life	.42		
The demands of everyday life often get me down	.38		
I live life one day at a time and don't really think about the future	.37		
Using technology at home after work hours interferes with my free time.		.64	
The amount of information available about me through technology worries me.		.'63	
I find myself interrupting what I am doing to attend to something else.		.63	
Technology invades people's privacy.		.62	
It is difficult for me to concentrate on work because my mind wanders to other things I need to do.		.59	
I am concerned about the privacy of technological communications.		.57	
Technology interferes with my personal creativity.		.51	
I lose track of time when using certain types of technology.		.50	
I worry about students getting accurate information on the Internet.		.46	
Technology's beeps and buzzing sounds bother me.		.45	
I feel overloaded by all the messages I need to answer in a day.		.44	
I get distracted by communication technologies like the telephone, fax machine, cell phones and pagers.		.43	
I worry if I don't check my messages for a while.		.43	
I feel I have control over what I do when I use a computer.			.70

I feel comfortable hooking up my computer and installing software.				.70		
I would like to have more computerized features in my car such as GPS, CD player, etc.				.62		
I enjoy using Power Point or other computerized visual aids to accompany my presentations.				.57		
I prefer to use a PDA (Palm Pilot, Blackberry, etc.) rather than writing my daily tasks in a traditional day planner.				.50		
I think that computers and other technological advances have helped to improve our lives.				.45		
XXXX enables me to work more efficiently					.86	
I easily find what I am looking for on XXXX					.80	
XXXX is a valuable resource to me					.72	
I enjoy interacting with my colleagues on XXXX					.49	
There is so much information on XXXX that I am overwhelmed					.57	
I think XXXX is an effective communication tool						.41
Communication content is easy to follow						.54
% of Variance	16.9	10.86	10.11	6.11	4.62	3.02

Table 4.4 *Status of Hypotheses*

Status	Hypotheses
Redundant	H_1: The existence of TechnoStress reduces psychological well-being.
Redundant	H_2: More frequent usage of net-centric information leads to increased psychological well-being.
Redundant	H_3: Attitude to computer usage determines psychological well-being, such as a positive attitude to computers results in increased psychological well-being.

4.3 Descriptive Results

The means, standard deviations, and zero order correlations for the present study variables are detailed in Table 4.5. The data remain in their original state having undergone no transformation, as all scores were within tolerance required for analysis.

Table 4.5 *Means, Standard Deviations and Zero-Order Correlation Matrix for Study Variables (N = 117)*

	Mean	S.D.	Job Role	Age	Frequency of Usage	Ambivalent Orientation (Positive) to Technology	Ambivalent Orientation (Negative) to Technology	Psychological Well-being	Exasperated Orientation to Technology	Appreciative Embracing Orientation to Technology	Portal (Technical Info) Orientation to Technology	Portal (All Info) Orientation to Technology
Job Role	5.74	1.96										
Age	6.48	1.73	.18									
Frequency of Usage	4.69	1.1	.02	-.03								
Ambivalent Orientation (Positive) to Technology	26.92	9.02	-.07	.14	.17							
Ambivalent Orientation (Negative) to Technology	29.54	8.12	-.03	.02	-.10	-.78***						
Psychological Well-being	79.13	11.23	.19**	-.10	.11	-.22**	.37***					
Exasperated Orientation to Technology	33.36	7.96	.38***	-25***	-.11	-.12	-.08	.05				
Appreciative Embracing Orientation to Technology	32.80	6.11	.23	-.02	.1	-.13	.25**	.23**	-.14			
Portal (Technical Info) Orientation to Technology	22.43	5.28	-.60	.24	-.27***	-.00	.03	-.08	-.17	.28**		
Portal (All Info) Orientation to Technology	7.82	2.52	-.37**	.13	-.02	.12	-.02	-.04	-.50***	.07	.49**	

Note. *** (p< .01), ** (p≤ .05), * (p< .1)

As stated previously, the researcher finds the quantitative analysis to be unhinged from the hypotheses that are resultant from the theoretical foundation of the literature review. This is due to the PCA results having a fundamental impact on the defined independent variables within this population. In fact the only scale that remained as a component was the PWB scale, so psychological well-being as a *dependent* variable remains intact. But, all other variables, being the *independent* variables, are no longer valid as they were conceptualised. So, the researcher discarded the previous model of interaction, and with a new configuration of independent variables, returned to the level of the research question. The techniques outlined in the methods chapter will still be used but instead involve the new set of variables. Regression will now be used to explore the relationship between the independent and dependent variables. Table 4.2 represents the new configuration of variables.

4.4 Regression Assumptions

For regression to proceed, a number of assumptions need to be checked.

4.4.1 Sample Size

The sample size needs to be appropriate with Stevens (1996), who advises 15 participants per predictor. Additionally, Tabachnick and Fidell (1996) provide an equation for minimum sample size, which when applied to the present study equates to 98 cases. Both recommendations are met in the present study, which has 7 predictors and 117 participants (cases).

4.4.2 Multicollinearity

When multicollinearity is present, interpretation can be problematic. If correlations exist they do not support a strong regression model (Pallant, 2003; Tabachnick & Fidell, 1996). The correlations were checked for values > .3 and < .7 (Pallant, 2003). One correlation of -.78 was flagged to be treated with caution during regression (i.e. Ambivalent Orientation – Positive to Technology and Ambivalent Orientation-Negative to technology). It is also important that there exist some correlations between the independent and dependent variables, this was present. Further investigation into multicollinearity required verifying appropriate Tolerance and Variance Inflation Factor (VIF) tests. The variables largest VIF was 2.88, well below the maximum threshold of 10 (Myers, 1990; Bowerman & O'Connell, 1990) and Tolerance was above .2 as per the recommended threshold (Field, 2013).

4.4.3 Residuals

These represent the difference between the predicted outcomes, of the model, and the actual samples captured. In this case the model fit is good with multiple correlation coefficient (R) of .45 (R square .21) and being significant ($p \leq .05$).

The data were therefore suitable for regression analysis. Finally, in general, the conventional significance level ($p \leq .05$) was used. However, in some cases due to a small sample size (N=117) a lower significance ($p < .1$) had also to be utilised, as supported by Stevens (2002).

To recap the variable relationships that will be explored using regression, see Figure 4.3, are, the independent variables:

1. Ambivalent Orientation - Positive to Technology
2. Ambivalent Orientation - Negative to Technology
3. Exasperated Orientation to Technology
4. Portal - Technical Orientation to Technology
5. Portal - All Orientation to Technology
6. Appreciative Embracing Orientation to Technology

With the dependent variable remaining Psychological Well-Being.

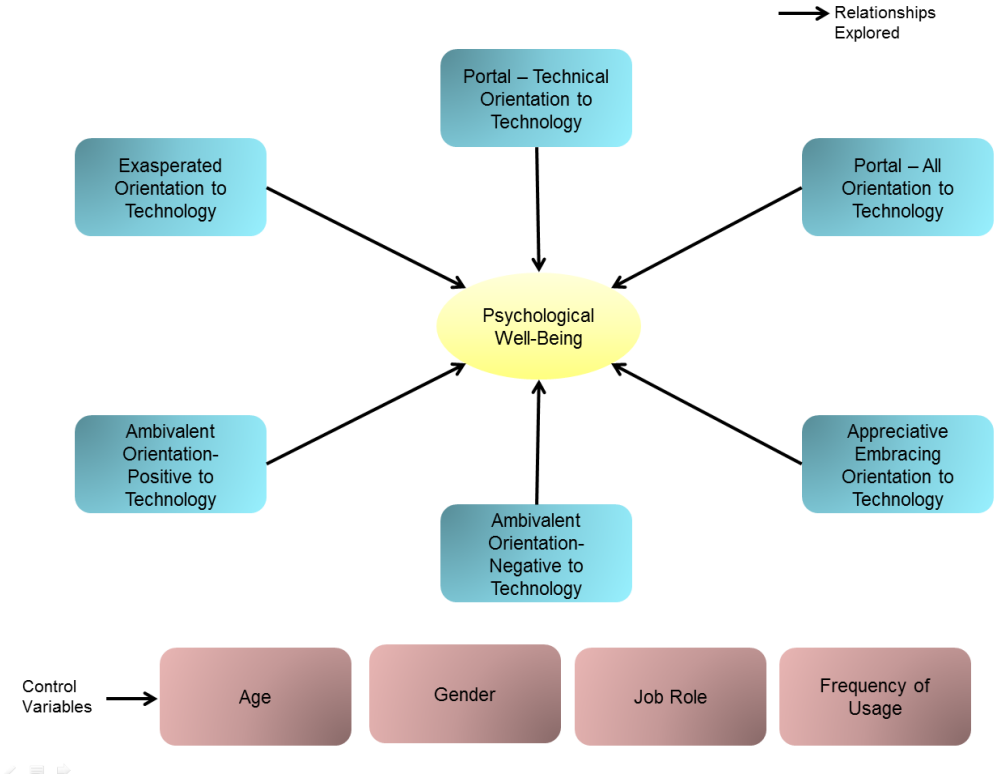


Figure 4.3. Model of new relationships for exploration using regression (component independent variables, dependent variable and control variables).

4.5 Main Effects Aggregate Population

Here the researcher utilised regression analysis. The regression model, in Figure 4.3, was analyzed using a hierarchical multiple regression, controlling for 'Frequency of Usage', 'Age', and 'Job Role' at Step 1, with all independent variables at Step 2. Both standardized and unstandardized outputs are reported in the output Table 4.6, so as to provide comparison with the moderation and mediation analysis later in this chapter.

Table 4.6 indicates for predictors at Step 1[adjusted R square = .03; $F(4,112) = 1.96$; $p>.1$] with 'Job Role' [standardized $\beta = .27$; 95% CI[= .56, 2.50]; $p \leq .05$] as the only significant positive predictor of 'Psychological Well-Being'.

Table 4.6 further indicates at step 2 [adjusted R square = .22; $F(6,106) = 4.23$; $p>.01$] significant positive effect of predictors 'Ambivalent Orientation – Positive to Technology' effect [standardized $\beta = .25$; 90% CI[.01,.61]; $p< .1$], 'Ambivalent Orientation - Negative to Technology' effect [standardized $\beta = .56$; 95% CI[.20, 1.35]; $p< .01$] and 'Appreciative Embracing Orientation to Technology' [standardized $\beta = .18$; 90% CI[.05,.64]; $p< .1$] as predicting a significant positive relationship to 'Psychological Well-Being'.

Additionally, at Step 2 'Age' now predicts as a significant negative effect [standardized $\beta = -.20$; 95% CI[-2.34, - .22]; $p \leq .05$] on 'Psychological Well-Being'. 'Job Role' now predicts a significant positive effect [standardized $\beta = .27$; 95%

CI[.56, 2.50]; p< .01] on 'Psychological Well-Being'. All other predictors are shown as non-significant in predicting 'Psychological Well-Being'.

Table 4.6 *Hierarchical Multiple Regression: Main Effects Aggregate Population (N=117)*

	Psychological Well-Being Standardized β *(Unstandardized β)*	
Predictor		
STEP 1	**Step 1**	**Step 2**
Frequency of Usage	.10	.52
	(1.01)	*(.59)*
Age	-.14	-.20**
	(-.92)	*(-1.33**)*
Gender	-.40	-.09
	(-1.26)	*(-3.08)*
Job Role	.22**	.27***
	*(1.23**)*	*(1.54***)*
STEP 2		
Ambivalent Orientation - Positive to Technology		.25*
		(.31)*
Ambivalent Orientation - Negative to Technology		.56***
		*(.77***)*
Exasperated Orientation to Technology		.04
		(.05)
Portal - Technical Orientation to Technology		-.16
		(-.33)
Portal - All Orientation to Technology		.12
		(.54)
Appreciative Embracing Orientation to Technology		.18*
		(.34)*
F(*4,112;* 6,106)	1.96	4.23 ***
R Squared	.07	.29
adj. R Squared	.03	.22
R2 Change	.07	.22***

Note. *** (p<.01) ; **(p≤.05); *(p<.1)

4.6 Main Effects Sub-Populations

Linear regressions were run for all three sub-populations, as captured by the demographic information for ‘Gender’, ‘Job Role’ and ‘Age’. The results will now be discussed.

4.6.1 Gender

With regard to the sub-population gender the results can be found in Table 4.7. Within the male population numerous predictors presented a significant impact, being ‘Ambivalent Orientation – Negative to Technology’ [standardized β = .52; 95% CI[.026, 1.25]; p< .01], ‘Appreciative Embracing Orientation to Technology’ [standardized β = .19; 90% CI[.01, 86]; p< .1] ‘Exasperated Orientation to Technology’ [standardized β = .20; 90% CI[.02, .54]; p< .1] all showing a significant positive effect on ‘Psychological Well-Being’ [adjusted R square = .16; F(6,95) = 4.20; p<.01].

Additionally, ‘Portal – Technical Orientation to Technology’ [standardized β = -.20; 90% CI[-.83, -.02]; p< .1] showed a negative significant effect on ‘Psychological Well-Being’

Table 4.7 *Linear Regression - Main Effects Sub-Population Gender*

	Psychological Well-Being Male (N=102) Standardized β *(Unstandardized β)*		**Psychological Well-Being** Female (N=15) Standardized β *(Unstandardized β)*
Predictor			
Ambivalent Orientation - Positive to Technology	.22 *(.27)*		.26 *(.42)*
Ambivalent Orientation - Negative to Technology	.52*** *(.70***)*		.56 *(1.2)*
Exasperated Orientation to Technology	.20* *(.28*)*		-.13 *(-.17)*
Portal - Technical Orientation to Technology	-.02* *(-.42*)*		.22 *(.06)*
Portal - All Orientation to Technology	.12 *(.56)*		-.11 *(-.44)*
Appreciative Embracing Orientation to Technology	.19* *(.37*)*		.24 *(.42)*
F (6,95)	4.20***	*F(6,8)*	.83
R Squared	.21		.38
adj. R Squared	.16		-.79
R2 Change	.21***		.38

Note. ***(p<.01), (p≤.05)*(p<.1)

With regard to females there were no predictors of 'Psychological Well-Being' [adjusted R square = -.79; F(6,8*)* = .83].

As the majority of the sample is male, 87 per cent, the gender division will undergo no further investigation as a determinate for this sample.

4.6.2 Job Role

The sub-population for ‘Job Role’ did not provide enough samples per job category for a complete analysis.

Out of all the job sub-populations investigated, the only job role that showed a significant effect on ‘Psychological Well-being’ [adjusted R square = .32; $F(6,54)= 5.84$; $p<.01$] was that of the ‘Technician for Enterprise Technology’, representing 51 per cent of the sample, see Table 4.8.

For this job role a number of predictors were significant. Being, ‘Ambivalent Orientation- Negative to Technology’ [standardized $\beta = .75$; 95% CI[.07, 1.63]; $p< .01$], ‘Ambivalent Orientation- Positive to Technology’ [standardized $\beta = .50$; 95% CI[.21,.98]; $p\leq .05$], ‘Appreciative Embracing Orientation to Technology’ [standardized $\beta = .42$; 95% CI[.25,1.51]; $p< .01$], ‘Portal – All Orientation to Technology’ [standardized $\beta = .29$; 90% CI[.18, 2.56]; $p< .1$], and ‘Exasperated Orientation to Technology’ [standardized $\beta = .29$; 95% CI[.16, .87]; $p\leq .05$] all predicted a significant positive effect on ‘Psychological Well-Being’.

‘Portal- Technical Orientation to Technology’ [standardized $\beta =-.47$; 95% CI[-1.79, -.14]; $p<.01$] however, resulted in a significant negative effect on ‘Psychological Well-Being’.

Table 4.8 *Linear Regression - Main Effects Sub-Population Job Role*

	Psychological Well-Being Technical Enterprise (N=61) Standardized β *(Unstandardized β)*
Predictor	
Ambivalent Orientation - Positive to Technology	.50** *(.59**)*
Ambivalent Orientation - Negative to Technology	.75*** *(.1***)*
Exasperated Orientation to Technology	.29** *(.52**)*
Portal - Technical Orientation to Technology	-.47*** *(-1.03***)*
Portal - All Orientation to Technology	.29* *(1.37*)*
Appreciative Embracing Orientation to Technology	.42*** *(.86***)*
F(6,54)	5.84***
R Squared	.39
adj. R Squared	.32
R2 Change	.39***

*Note.*** (p<.01); ** (p≤.05); *(p<.1)

4.6.3 Age

A number of age ranges were present in the data, however, only two, 46 to 50 and 51 to 55, showed any significant predictors of 'Psychological Well-Being'.

For the two categories mentioned see Table 4.9. From the first sub-population of people between 46 and 50 years of age 'Ambivalent Orientation – Negative to Technology' [standardized β = .73; 95% CI[.03,1.88]; p< .01], 'Ambivalent Orientation

– Positive to Technology' [standardized β = .75; 95% CI[-.53,1.84]; p< .01] and 'Appreciative Embracing Orientation to Technology' [standardized β = .38; 95% CI[2.65, .44]; p≤ .05] predicted a significant positive effect on 'Psychological Well-Being' [adjusted R square = .47; F(6,17) = 4.33; p< .01].

In the second sub-population of people between 51 and 55 years of age if was found that both 'Ambivalent Orientation – Negative to Technology' [standardized β = .79; 95% CI[1.79, .86]; p≤.05] and 'Appreciative Embracing Orientation to Technology' [standardized β = .28; 90% CI[.10, 1.33]; p<.1] predicted a significant positive effect on 'Psychological Well-Being' [adjusted R square = .76; F(6,10) = 9.42; p<.01].

Table 4.9 *Linear Regression - Main Effects Sub-Population Age*

	Psychological Well-Being Age 46 to 50 (N=24) Standardized β *(Unstandardized β)*		**Psychological Well-Being** Age 51 to 55 (N=17) Standardized β *(Unstandardized β)*	
Predictor				
Ambivalent Orientation - Positive to Technology	.75***		-.04	
	*(1.17***)*		*(-.04)*	
Ambivalent Orientation - Negative to Technology	.73***		.79**	
	*(1.14***)*		*(.90**)*	
Exasperated Orientation to Technology	.29		-.15	
	(.56)		*(-.29)*	
Portal - Technical Orientation to Technology	-.11		.06	
	(-.30)		*(.15)*	
Portal - All Orientation to Technology	.02		.08	
	(.11)		*(.46)*	
Appreciative Embracing Orientation to Technology	.37**		.28*	
	*(1.40**)*		*(.71*)*	
F	F(6,17)	4.33***	F(6,10)	9.42***
R Squared		.61		.85
adj. R Squared		.47		.76
R2 Change		.61		.85***

Note. *** (p<.01); ** (p≤.05); *(p<.1)

4.7 Analysis Next Step Summary

Due to the findings within the aggregate and sub-population main effects, for age and job, it looked likely, due to the nature of these variables, that some moderation and or mediation was present.

So, the next step in the analysis was to conduct moderation, and mediation, on the variables, based on both the hierarchical aggregate effects, and the sub-population effects that were significant, being:

- Gender
- Age
- Job Role
- Ambivalent Orientation- Negative to Technology
- Appreciative Embracing Orientation to Technology

However, as the population is predominately male (87%), ‘Gender’ will not be considered for moderation and mediation.

4.8 Moderation in the Aggregate Population

As mentioned in the method section of this chapter, moderation utilises the Hayes (2013) PROCESS to investigate the variables summarised above.

4.8.1 Age & Ambivalent Orientation – Negative to Technology

The first moderation investigated is represented by Figure 3.4 showing the potential moderating effect of Age (M) on the relationships between ‘Ambivalent Orientation – Negative to Technology’ (X) on ‘Psychological Well-Being’ (Y). This places the moderator as yet a further 'independent variable' capable of predicting the ‘dependent variable’, producing a modifying effect. For example, it might prove to be the case that ‘Ambivalent Orientation – Negative to Technology’ predicts ‘Psychological Well-Being’ only at certain levels of Age. This is possible if the model interaction of XM is itself predictive of Y, represented by Figure 4.4 and Figure 4.5.

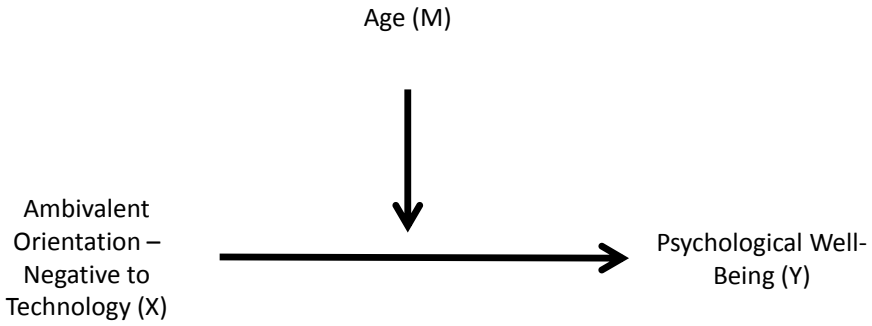


Figure 4.4. Moderating interaction effect–age & ambivalent orientation – negative to technology.

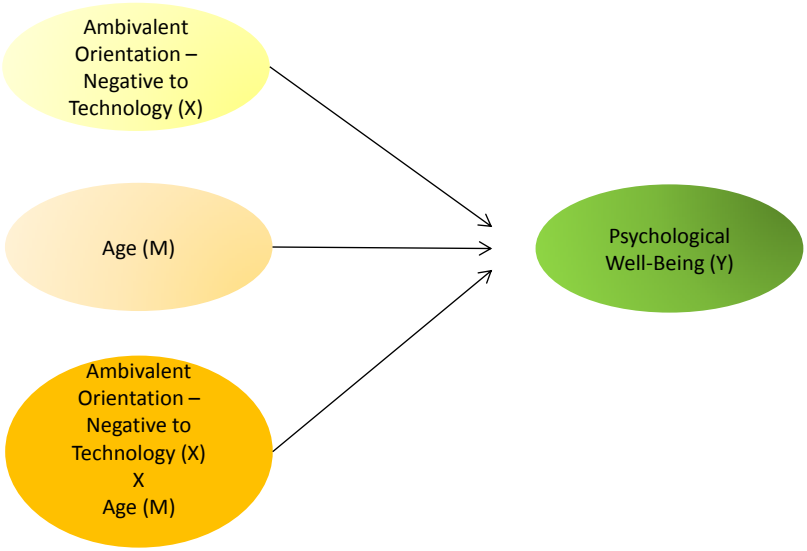


Figure 4.5. Moderator model interaction – age & ambivalent orientation - negative to technology

Moderation is indicated by having a significant interaction effect (Field, 2013) which for this 'Ambivalent Orientation – Negative to Technology ' (X) x 'Age' (M) is significant [unstandardized β= .12; 95 % CI[.01, .23]; *t* = 2.10; p≤.05] meaning that Age moderates the positive relationship between 'Ambivalent Orientation – Negative

to Technology' and 'Psychological Well-being ' providing a model that explains 17 per cent of variance of which the interaction explains 1.6 per cent , see Table 4.10.

Table 4.10 *Moderation Interaction Effect – Age & Ambivalent Orientation to Technology*

	Psychological Well-Being (Y) Unstandardized		
	B	*SE*	*t*
Predictors			
Age (M)	-.71	.97	81.64
Ambivalent Orientation - Negative to Technology X	.52***	.49	-1.44
Ambivalent Orientation - Negative to Technology(X) x Age (M)	.12**	.06	5.57
F(*3,113)*	12.74***		
R Squared	.17***		

Note. *** (p<.01) ; **(p≤.05); *(p<.1)

4.8.2 Age & Appreciative Embracing Orientation to Technology

The second potential moderation is represented by Figure 4.6 and Figure 4.7, depicting the potential moderating effect of 'Age' (M) on the relationship between 'Appreciative Embracing Orientation to Technology' (X) on 'Psychological Well-Being' (Y).

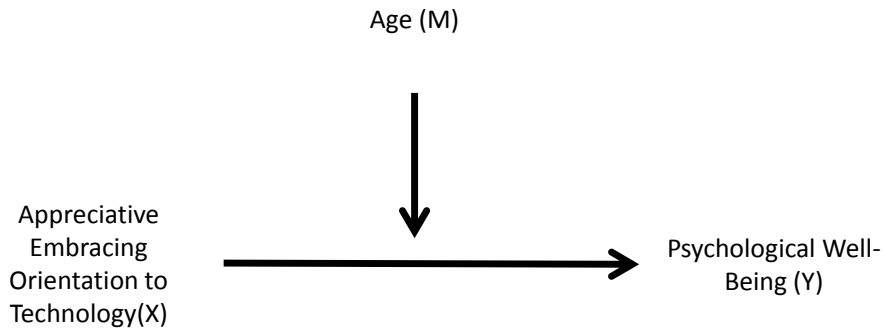


Figure 4.6. Moderating Interaction effect – age & appreciative embracing orientation to technology.

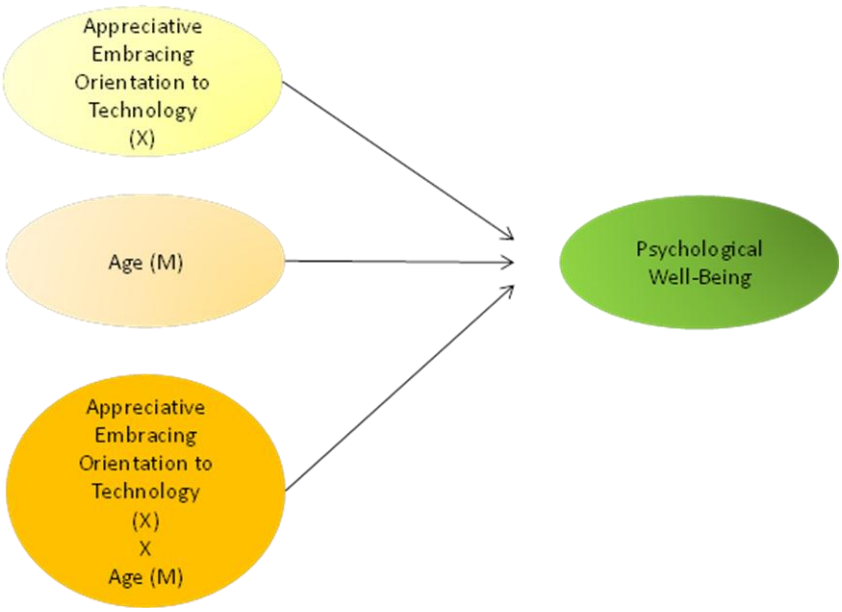


Figure 4.7. Moderator model interaction– age & appreciative embracing orientation to technology.

'Appreciative Embracing Orientation to Technology ' (X) x 'Age' (M) is significant [unstandardized β= .18; 95 % CI[.04, .31]; t = 2.62; p<.01], meaning that Age moderates significantly the relationship between 'Appreciative Embracing Orientation to Technology' and 'Psychological Well-being', ' providing a model that explains 10 per cent of variance of which the interaction explains 3 per cent, see Table 4.11.

Table 4.11 *Moderation Effect – Age & Appreciative Embracing Orientation to Technology*

	Psychological Well-Being (Y)		
	Unstandardized		
	β	*SE*	*t*
Predictors			
Age (M)	-.36*	.56	1.64
Appreciative Embracing Orientation to Technology (X)	.53***	.16	3.39
Appreciative Embracing Orientation to Technology (X) X Age (M)	.18***	.07	2.67
F(*3,113)*	4.83***		
R Squared	.10***		

Note. *** (p≤.01) ; **(p≤.05); *(p<.1)

4.9 Moderation Relative to Sub-Populations

When the sub-populations were investigated, using regression, it was determined that no significant moderating interactions were present.

4.10 Mediation

As per the hierarchical regression the only variables that are candidates for the mediation investigation are:

1. Ambivalent Orientation – Negative to Technology
2. Appreciative Embracing Orientation to Technology

The only mediation model that was significant is depicted in Figure 4.8.

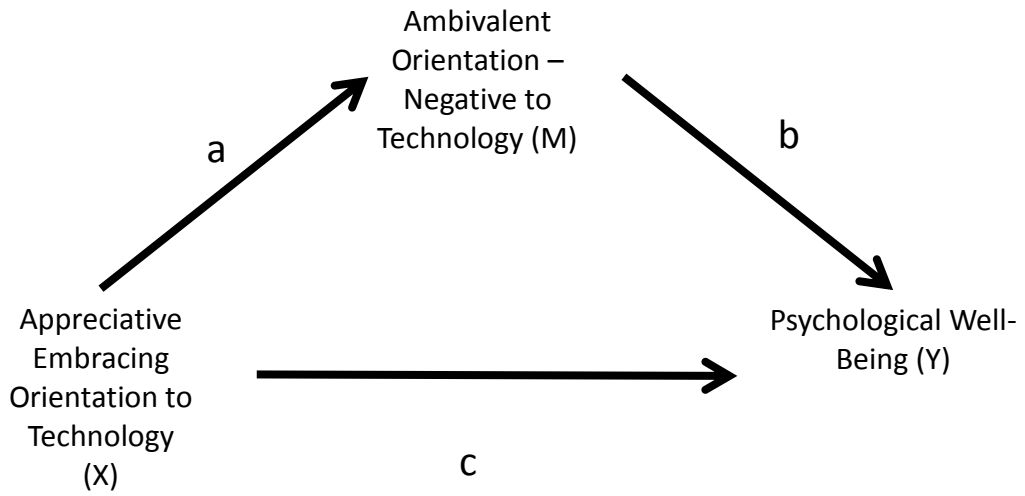


Figure 4.8. Mediation effect – potential to influence paths 'a' and 'b'.

Based on a simple mediation performed, using ordinary least squares path analysis as per the model in Figure 4.8, it was found that 'Ambivalent Orientation – Negative to Technology' [unstandardized β= .26; 95 % BCa CI[.01, .13]; p≤.05] indirectly mediated the relationship between 'Appreciative Embracing Orientation to Technology' and 'Psychological Well-Being' [R Square =.06; F(4,112) = 7.89; p<.01] see Table 4.12.

Table 4.12 *Mediation Effects*

	Ambivalent Orientation - Negative to Technology (M) Unstandardized		**Psychological Well-Being (Y)** Unstandardized	
	β	*SE*	*β*	*SE*
Predictors				
Predictor Only				
Appreciative Embracing Orientation to Technology (X)	.31**	.12	.42**	.16
Predictor and Mediator Combined				
Appreciative Embracing Orientation to Technology (X)			.26*	.16
Ambivalent Orientation - Negative to Technology (M)			.48***	.12
Job	-.17	.38	1.27**	.49
Age	.17	.43	-.96*	.55
F(*3,113)*	2.29			
F(*4,112)*			7.89	
R Squared	.06**		.22***	

*Note. **** (p<.01); **(p≤.05); *(p<.1); This provides a statistically significant mediator effect, unstandardized β = .15, 95% BCa CI [.03, .29]; Sobel test = .15, p<.05.

4.11 Relationship Summary

To summarise the various significant variable relationships and interactions see Figure 4.9. These various relationships will be discussed in relation to theory, and implications, in the discussion chapter of this study.

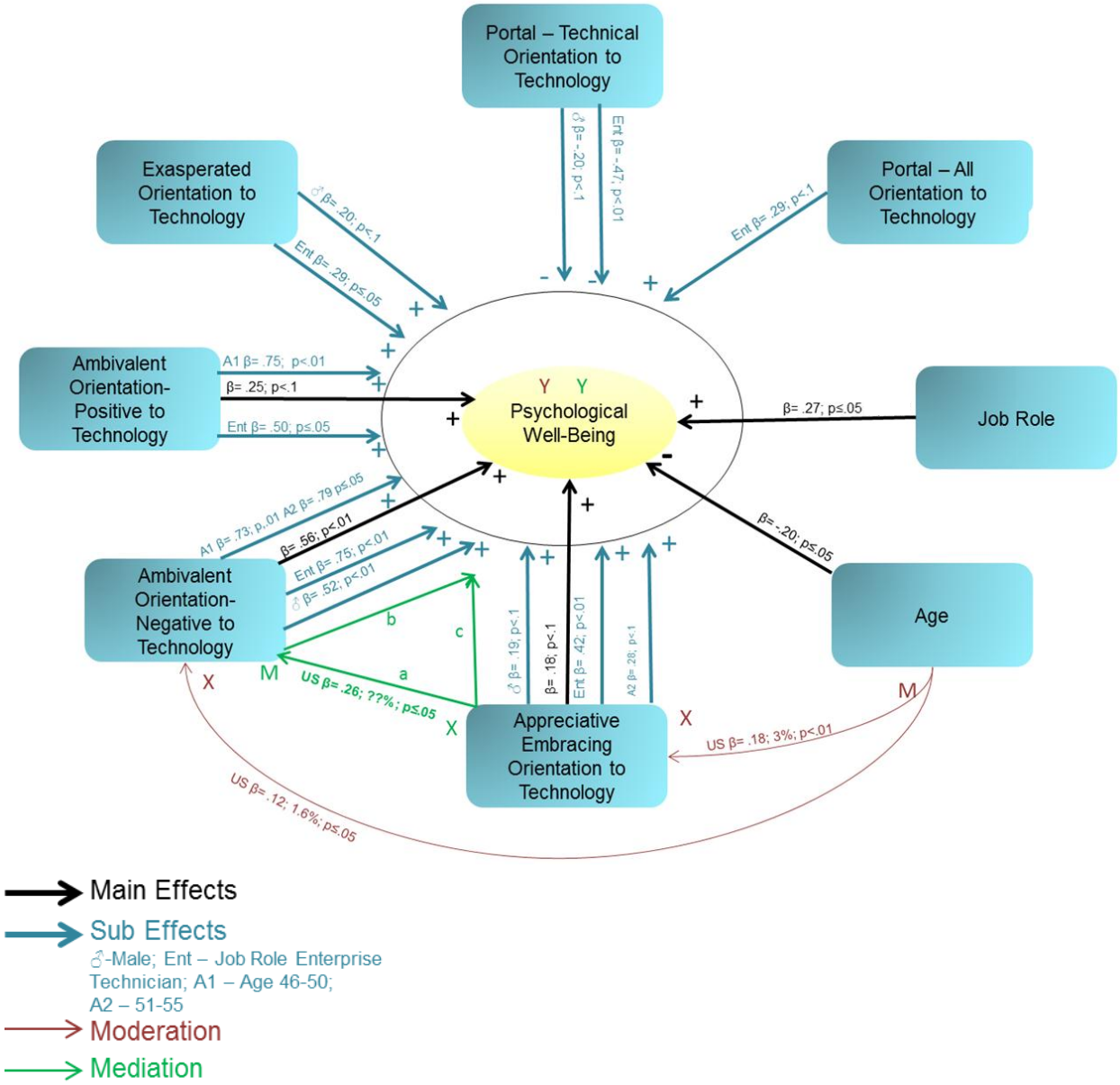


Figure 4.9. Statistical relationship summary from quantitative results.

CHAPTER 5 - QUALITATIVE STREAM

1. INTRODUCTION

This chapter aims to outline the approach and results of the qualitative stream of the present study. The study aims to explore the following research question:

How are net-centric systems experienced in a work context?

As this research is exploratory the researcher needed to keep an open mind to any aspect of this experience that was mentioned by the various participants. However, as with any research it is important to be knowledgeable about what is currently understood of this experience. So therefore, the chapter will start by providing a framework of relevant theory from the literature review.

The chapter will then present the rationale for the method selected, participant selection, the process adopted, and deployed, for data collection and analysis. The compliance with ethical and legal frameworks will also be highlighted. Following on from this, it will present the results achieved from executing the selected method.

2. RELEVANT THEORY

From the literature review we can understand a few aspects of our experience of net-centric systems that informs the stream. The researcher will now summarize the salient research findings and theories.

2.1 Needs Gratification

Considerable research has investigated the purposes for which people use the Cloud. One dominant finding is that people use the Cloud as a means of satisfying needs, called gratification theory (Kim & Weaver, 2002). According to this theory, an individual chooses the media through a partial matching of needs to a perception of gratification of these needs, by engaging with the media. A particular purpose, recurrent as a finding in research, is that of seeking information. As mentioned previously, Schiffman et al. (2003) uncovered that 50 per cent of people engage with the Cloud in order to access information. Further studies replicate this finding such as the Stanford University (O'Toole, 2000) study of over 4000 users, and Weiser (2001). Rodgers and Sheldon (2002) also found a primary motive for Cloud usage was researching. It is possible that this study finds that net-centric usage in the workplace is based on needs gratification.

2.2 Information Anxiety and Overload

A number of negative and potentially stressful consequences of using computer systems have been highlighted in the literature review. Aspects such as annoyance due to quality issues ("BBC", 2003), information overload, negative cognitions (Tarafdar et al.,2011), anxiety from frustration due to the limitations of the technology, and depression related to a long-term feeling of inability to cope (O'Driscoll & O'Driscoll, 2010) have been found. In fact, even small but frequent frustrations create a cumulative negative effect both physically and psychologically (Weil & Rosen, 1997).

It is thought that electronic media bombards people with vast amounts of information leading to unhealthy levels of anxiety (Rodman & Fry, 2011), termed ‘information anxiety’ by Wurman (1980).

The negative impacts can potentially be understood through some models of stress. One of these models, as previously mentioned, is McGrath’s process model. The model of stress starts with a situation that is presented, and then appraised and a perception is formed. Following on, a resultant action is decided upon and implemented. For example in the case of information overload the person could be faced with keeping up with many forums electronically that they perceive as required in order to be credible in their area of expertise. They may respond by working late into the evening to keep abreast of developments and continually working long hours may not be a sustainable process, and lead to strain in turn impacting their ability to work efficiently.

Another relevant and highlighted model is Karasek’s (1979) theory of stress. Here stress is created due to exposure to environments with high demands and the person having little control over these demands, termed job decision latitude. A high demand and low control environment may result in negative feelings of apathy, tension, depression and alienation (Salvendy, 1972). It could be the case that participants feel high demands of their particular job coupled with a lack of control due to net-centric systems in the workplace. Indeed the net-centric systems are by their very nature decentralized and so little in control especially in the case of information publication.

2.3 Networked Information

Electronic information as presented in net-centric systems has particular attributes that are different from other kinds of information, such as written or verbal. One of the main characteristics of this type of information is that it provides the ability to connect information through hypertext links. These links make it simple to follow nodes of information, and to rapidly gain access to new information, creating increased informational depth (Amichai-Hamburger, 2008).

There are some implications of using this type of information. As information is linked, this means that the maintenance of links needs to be considered as part of any update. It has been found that links that are not maintained and are out of date impact the trust that people have in the information (Pitt et al., 2003).

Another aspect of digital information is that access to so much information has been found to mask the clues that assist people to process the information and their ability to use this information to make appropriate decisions (Weil & Rosen, 1997).

This overview concludes the relevant research findings and theories that could inform the qualitative part of the present study. The chapter will now move onto the methodology employed and the rationale for this methodology.

3. THE METHOD

3.1 The Data Collection: Interview

This section will outline the procedure used in order to perform a professional collection of the transcripts for input into IPA process. Figure 5.1 represents the steps followed, each of these will be described and rationale provided as relevant.

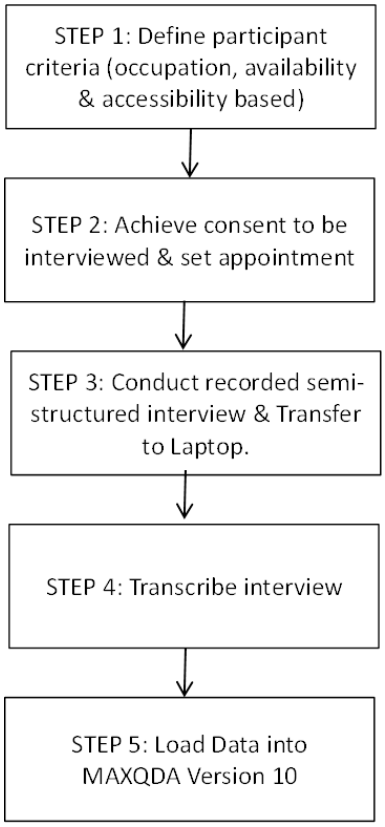


Figure 5.1. Data collection procedure.

STEP 1: Define Participation Criteria

The sample was driven by the desire to capture different occupations that utilize the phenomenon under investigation. The researcher had access to many organisational roles within the technology sector where the participants work. However, it was deemed to be too focused a sample group providing quite a restricted view on the

phenomenon. Therefore the researcher sought out people who interacted with net-centric data on a daily basis, as part of their job, across other sectors.

Another important factor for selection was the availability of the personnel to dedicate at least one hour to the research, and the accessibility of these people to the researcher. The researcher reviewed the various occupations they interacted with, to ensure as much occupational coverage as possible, and consideration of ability to accommodate the time required for the study

The sampling strategy was criterion or representative based, hinging on various professions that engaged with the phenomenon in their daily job role. It is also simultaneously idiographic (Bailey, 1992) and purposeful in nature. This is a normal sampling strategy of naturalist research (Lincoln & Guba, 1985). The final list represented people in different occupations who were then approached and asked to take part in the study, represented in Table 5.1 for the demographics of the final sample.

Table 5.1 *Qualitative Participants Summary*

Occupation	**Gender**	**Age Range**	**Code**	**Order of Interview**
Teacher	Male	45-50	TE	1
City Electrical Engineer	Male	60-65	CE	2
Musician	Male	44-50	MS	3
Debt Collector	Male	35-40	DC	4
IT Technical Consultant	Male	45-50	IT	5

STEP 2: Achieve Consent To Be Interviewed & Set Appointment

Each participant had a professional relationship with the researcher. Initially people were called, and the research topic was introduced and the time commitment was explained. At this point, verbal agreement was obtained to take part in the present study and interviews were scheduled. From the people approached, six agreed to take part. The only person who withdrew was a female. All other participants were male.

All principles outlined in the Ethical and Legal Considerations Chapter of this dissertation were followed. See Appendix A for the consent form used.

STEP 3: Conduct Recorded Semi-Structured Interview

The interview is a widely accepted method of collecting data across theoretical approaches in qualitative applied research (King, 2004). The semi-structured interview enables discussion to be focused using both pro forma and Socratic questions, resulting in a semi-structured approach.

The researcher felt it was important to employ a semi-structured interview approach to enable the participant to discuss their priorities and agenda rather than respond to a set of defined questions. Thus, only an initial question was used to open the discussion, thus freeing it from a priori hypotheses. However, the researcher needed to be able to keep the discussion focused on the research question. To achieve this, a mixture of questions and reflections, such as 'sounds like…' was used. This facilitated an exploration of the participant's response through clarification and

interpretation *during* the interview. It led to a dynamic and ‘guided’ in-depth conversation (Loffland & Loffland, 1995) at a micro level of understanding.

In alignment with using the IPA technique, the researcher must be flexible enough to follow the interviewee with any unanticipated directions as the description of their experience is revealed (Smith & Osborn, 2008). Semi-structured interviews also supported this requirement.

The rest of the interview used the ‘Socratic’ questioning technique to clarify what had been said, probe assumptions, and explore perspectives and consequences of the respondent’s responses (“University of Michigan”, 2013). Socratic questions cannot be defined prior to the respondent answering the initial questions, as they are generated in alignment with the participant’s response.

The interviews varied in length from 35 to 60 minutes, and were conducted in a confidential location typically away from the work environment, supporting confidentiality and reducing the risk of interruption. All interviews were recorded on an Olympus Digital Recorder. The researcher checked that the interviewee was comfortable with having the interview recorded, which they were. All final recordings were clear and usable. The researcher was also conscious that using a recording device may impact and limit the responses to questions (Willig, 2004). However, respondents seemed to forget about the recording device as the interview progressed.

The researcher did not take any notes during the interview, as it would distract the researcher's attention from the participant's response, or may be perceived by the participant as a rating by the researcher, so influencing what was said (Brewer, 2004). The interviewees were informed that a copy of the transcript would be available to them should they wish to have it, nobody showed an interest in this.

The interview then started with an explanation and the opening questions, see Appendix H. The introduction positioned the research within the context of 'work' and outlined the areas of interest to the interviewee.

STEP 4: Transcribe Interviews.

The interviews were transferred to the researcher's laptop using a standard USB cable, requiring no software. They were listened to and transcribed by the researcher over a number of months. Transcription was recorded in MS Word 2000. The transcribed interviews were allocated a two letter code indicative of their occupation, as a reminder Table 5.1 is replicated on this page.

Table 5.1 *Qualitative Participants Summary*

Occupation	Gender	Age Range	Code	Order of Interview
Teacher	Male	45-50	TE	1
City Electrical Engineer	Male	60-65	CE	2
Musician	Male	44-50	MS	3
Debt Collector	Male	35-40	DC	4
IT Technical Consultant	Male	45-50	IT	5

Transcript accuracy was verified by a person not associated with the present study, or the participants, by listening to the recordings while reading the transcripts. No errors were found.

STEP 5: Load Data into MAXQDA Version 10

There is a lot of debate on the usage of software to perform IPA. However, Smith et al. (2009) provides no guidance on this, and various bodies of IPA researchers have found using software useful ("Yahoo! Groups", 2000). As the researchers prefers the organisation and flexibility that a package such as MAXQDA can provide, this means was chosen above hand-written analysis. Using software also allows, if required, data analysis to be transparent by providing a chain of evidence for other researchers to follow (Yin, 1989). The process of loading the data into MAXQDA V10 was quick and effective and involved importing the MS Word files into the product. MAXQDA then organises the interviews into a structure ready for analysis.

3.2 Data Analysis: Interpretive Phenomenological Analysis (IPA) Process

As the aim of the research is to gain an understanding of the user experience of the phenomenon of net-centric systems at work, the IPA method was chosen. IPA is used extensively in psychological research. IPA has been described as a form of applied psychology that is focused on people's engagement with the world (Smith et al., 2009), and is an analytic procedure, resulting in its systematic and widespread application in psychological research (Willig, 2004). IPA provides a stance that transcends hypothesis, beliefs and foregone conclusions, in order to understand the world as perceived through our experience (Willig, 2004). IPA focuses on what the participants tell the researcher about their experience, with the researcher being the

vehicle of interpretation to convey their understanding of the participant's experiences (Smith et al., 2009) to the present study reader. Another determinate of method selection was sensitivity to context. IPA allows close engagement with the participant (Smith et al., 2009) anchored within the context under investigation, thus increasing the validity of the present study.

IPA was developed in 1996 by Jonathan Smith, having it's foundation in interpretation (hermeneutics) and idiography (Smith, 2004, 2007; Smith et al., 2009). Phenomenology represents both a philosophy and a set of research methods that address the exploration and perception of human experience (Langdridge, 2007).

Interpretation (hermeneutics) is about the theory and practice of interpreting text meanings (Rennie, 1999). The interpretative orientation of IPA draws on the theoretical perspectives of three hermeneutic theorists; Heidegger, Schleiermacher and Gadamer (Smith et al., 2009). The idiographic component centralises the 'case' or interview as representative of the unique experience of that person within the context of the experience (Eatough & Smith, 2008), in this case a work setting. The idiographic approach advocates small samples for IPA studies (Smith et al., 2009). In the present study there were five participants.

The IPA approach is in essence inductive in that the idiographic analysis provides themes that eventually transcend a single perception when analysis extends across the same phenomenon experience of others (Smith et al., 2009). The final results represent the actual experience, rather than any hypothesized aspect of the experience.

Smith et al. (2009) provides numerous guidelines for approaching IPA; however, there is no fixed advocated approach. IPA does, however, involve an iterative process over a period of time that enables the researcher's interpretations to develop. One of the aims of these guidelines is to provide a clear, systematic and auditable process (Smith et al., 2009) while still allowing for 'creativity and freedom' (Willig, 2004).

The researcher's IPA approach is captured in Figure 5.2 as recommended by Smith et al. (2009). Each step will now be outlined.

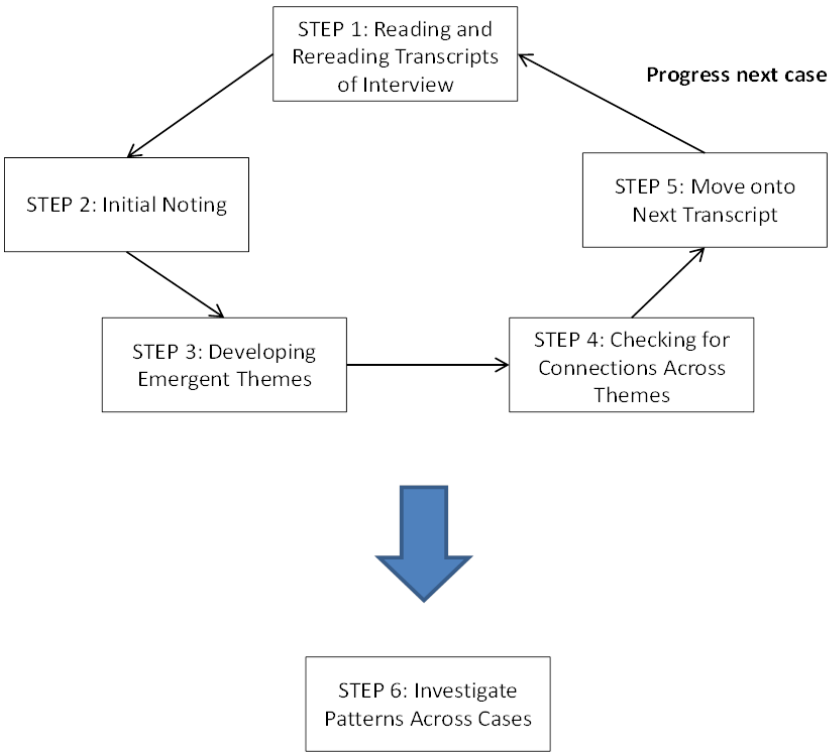


Figure 5.2. IPA process.

IPA STEP 1: Reading and Rereading Transcripts of Interview

The IPA process starts with complete immersion in the transcriptions and audio recordings of the interviews. Integral to the IPA approach is the call for a starting point of ‘epoche’. This means that the researcher needs to be aware of their own judgments, reactions and assumptions, so that they can be suspended (Willig, 2004) or ‘bracketed’ (Smith et al., 2009). Bracketing assists in ‘containing’ the researcher’s viewpoint, or bias, which may, if not understood and recorded, cloud their interpretation of the phenomenon. This in turn would limit empathy with the participant’s experience. Without empathy there exists sympathy. Sympathy is hinged on one’s own feelings and bracketing allows the researcher to move from an ‘own’ emotional perception to the perception of the ‘other’. Thus, the researcher started by ‘dumping’ or ‘bracketing’ all their thoughts and emotions that came to mind when thinking about the experience of net-centric systems. This can be found in Appendix I. These reactions are considered as part of the present study.

The researcher listened to the interview while reading the transcript, in order to recall the tone, as a reflection of the emotional state, of the interviewee and match it to the recorded text. The pace of the interview was noted in each case, and the movement from general to specific events, from relating facts to moving into emotions as recommended by (Smith et al., 2009).

IPA STEP 2: Initial Noting

This involves keeping an open mind to anything that the researcher finds of interest. MAXQDA provides a facility where notes can be assigned to the text, and this was utilized. Going through the transcript in detail in a focused manner increases

familiarity with the responses, and leads to an understanding of how the participant verbalizes, intellectualizes and feels about the topic under investigation (Smith et al., 2009). With each reading the researcher noted their interpretations and thoughts on the transcript in MAXQDA. The researcher was aware that the Socratic questions created two levels of interpretation. Firstly the participant could explain and, so, make further sense of their experience through the researcher's encouraged elaboration. Secondly, the researcher created the opportunity to provide their interpretation of the participant's response ("Brunel University London", 2013), thus allowing the participant to check the understanding presented.

As the instrument of a qualitative enquiry is ' the researcher' themselves, it is appropriate to provide an overview of their professional skills with the aim of substantiating the quality of the data capture and analysis. The researcher is a qualified and accredited counselor, listening and interpretation skills are developed and practiced at a professional standard. This enables the researcher to move between explicit to implicit interpretations during the interview itself. The researcher is by nature and training 'open to experience', and this is an important attitude to display when undertaking the analytical stage of IPA ("Brunel University London", 2013).

The researcher conducted 'exploratory commenting' with attention to three areas as outlined by Smith et al. (2009):

1. Descriptive Comments: Context of participant's response (Explicit)
2. Linguistic Comments: Focused on the language used (Explicit)
3. Conceptual Comments: Interrogative and conceptual (Implicit)

The researcher found that as the interviewed progressed they encouraged a conceptual understanding. For example, when a participant's response was given the researcher would check that she had understood the explicit content, and also present an understanding of the implicit context. At this point the participant could clarify the researcher's understanding. In the researcher's opinion, this technique increased the validity of the present study by providing transparency of part of the analysis process.

IPA STEP 3: Developing Emergent Themes

The benefit of using MAXQDA is that all notes are easily linked to the transcribed interview statements. This enables an organized analysis making it easy to visualize developing emergent themes. Here the researcher works with their notes as the point of analysis. See Appendix J for an example coded interview. Thus, the interview ceases to be the unit of analysis, and is replaced by the researcher's notes as a basis from which to construct an interpretation of the emergent themes. The researcher then reviewed the notes and analysed them for connections and patterns (Smith et al., 2009). This process de-constructs the interview transcript and rebuilds part of it into groupings called themes. Each theme captures a specific understanding, and is represented by the elements of interviewee's response and researcher's interpretation. A theme links content and interpretation in the form of psychological constructs, or terminology, found in psychology. See Appendix K for an example of themes found and represented in MAXQDA.

IPA STEP 4: Checking for Connections Across Themes

Here the researcher overviews the occurrence of the themes and organizes them into logical categories. It is not necessary to incorporate all themes into the categories, however, as the researcher was looking at the overall experience of net-centric technologies; most themes were incorporated at this stage. The categories were created termed ‘super-ordinate’ themes, a process by which the grouping of existing themes formed a new descriptive theme. This process is called subsumption (Smith et al., 2009). The researcher did use some polarization where themes were contrasted as being opposite. This can be seen in the data by the ambivalent aspects of an experience highlighted in the discussion chapter. When looking at the overall ranking of themes the researcher could detect potency from emphasis on theme. The last part of this process involved tabulating the results per participant to visually show the themes and their references.

IPA STEP 5: Move onto Next Transcript

The process is then repeated for the next transcript. Each transcript was treated as an individual case, and the researcher worked on the transcripts sequentially.

IPA STEP 6: Investigate Patterns Across Cases

This step involves reviewing the tabulated super-ordinate themes from each case against the other cases, and again grouping similar categories and developing more emergent themes. With MAXQDA this process is relatively easy to achieve. Reconfiguring of themes simply involves a ‘drag’ and ‘drop’ that also maintains all data integrity to themes and the transcript. MAXQDA also makes it easy to bring up a text link from a transcript, so that it can be further reviewed if required during the process of say, polarization. Using the software ensured complete organization while

allowing flexibility to reconfigure analysis. See Appendix L for an example of MAQDA linkage of transcript to codes.

3.3 Addressing Limitations

IPA does have some limitations for consideration. Firstly, in this case, transcripts of semi-structured interview texts are used as the basis for meaning analysis,and this relies on the representational validity of the language used (Willig, 2004). This means that language itself shapes reality, rather than representing it, and in documenting an experience in this way access to the phenomena is prescriptive rather than representative. This has been kept in mind during the interviews and was why some more reflective questions used metaphors and similes to try to draw parallel with images.

Secondly, there is typically no attempt to link the perceived experiences with the researcher's bias. This could limit the understanding of the phenomena under investigation (Willig, 2004). The researcher has tried to address this concern through highlighting their biases by providing the bracketing for review in Appendix I.

Lastly, the topic of generalizability should be discussed. Stephens (1982) distinguishes two kinds of generalizability, being horizontal and vertical for qualitative studies. Horizontal generalizability deals with research findings relevant across settings, and vertical generalizability addresses generating interpretative theory. This study hopes to address mainly vertical generalizability, in that findings should be considered as improving awareness, increasing insight while developing existing theories, and leading to the generation of new hypotheses (Johnson, 1997; Yardley,

2008). It is hoped that readers find some resonance with the results, while also triggering a re-evaluation of their understanding of the phenomenon under investigation (Johnson, 1997). As a consideration of the sample was to cover different occupational interactions with net-centric data, it is hoped that horizontal generalizability has also been considered.

3.3.1 Fidelity and Validity

As well as considering the limitation of using IPA, the quality aspects must also be addressed in order to ensure a professional study. Rudestam and Newton (2001) highlight the quality issue of fidelity for qualitative studies. This was facilitated through the recoding of the interviews and the independent checking of transcript to interview recording.

When considering validity of IPA studies there seems to be no specific assessment recommended. However, Smith et al. (2009) recommend Yardley's (2000; 2008) approach focusing on:

1. Sensitivity to context
2. Commitment and rigor
3. Transparency and coherence
4. Impact and importance

It is the hope that this dissertation addresses points two to four above in its chapters. However, sensitivity to context could be embellished now with some further background on the researcher. The researcher works in two fields of specialism.

Firstly, as stated they are a professionally qualified counsellor. Secondly, the researcher is a professionally trained Information System Technologist working at Director level within an International Software Organisation for the last 5 years. Prior to that, the worked as a technologist in various middle management and practitioner roles for 20 years. As a standard part of their job, the researcher's staff access net-centric systems on a daily basis, as does the researcher. So, the researcher is in their opinion sensitive to the context of the present study.

Now that a foundation of methodology has been established let us move onto the results of the qualitative investigation.

4. THE RESULTS

This part of the chapter aims to present the results of the qualitative stream of the study. The researcher hopes to be systematic and transparent in their presentation of both interviewee response and researcher's interpretations. Only the most potent super-ordinate themes will be presented, a full list of themes can be found in Appendix M.

Although single themes are being presented, one still needs to be mindful that these, even if reported in isolation for the ease of understanding, rarely exist in life in such isolation. But, rather in reality there were many concepts inter-twined in these themes in the responses. Thus, the researcher will attempt to highlight these complexities within the results by trying to maintain some of the integrity and essence of the interviewee's complex responses to the research topic. A summary

will be presented at the end of this chapter that intends to weave everything into a coherent whole.

From the interview analysis using IPA framework, super-ordinate themes emerged to the researcher. The themes discussed below were present in the majority, if not all, of the cases of the present study, and so were deemed potent. These super-ordinate themes are presented in Table 5.2, showing what Smith et al. (2009) calls the identification of recurrent themes.

Table 5.2 *Recurrent Themes*

Super-ordinate Theme	**DC**	**CE**	**IT**	**TE**	**MS**
1. Impact of Magnitude of Information	YES	YES	YES	YES	YES
2. Pace of Work	YES	YES	YES	YES	YES
3. Frustrations that Limit Engagement	YES	YES	YES	YES	YES
4. High Dependency on Data	YES	YES	YES	YES	NO
5. Collaboration	YES	YES	YES	YES	YES
6.Increases Confidence	YES	YES	YES	YES	YES
7. Excitement to Embrace	YES	YES	YES	YES	YES

Table 5.3 represents the super-ordinate themes and their related sub-ordinate themes (Smith et al., 2009) that will be discussed in the remainder of this chapter.

Table 5.3 *Super-ordinate & Sub-Themes*

Super-ordinate Theme	**Sub-Theme**
Impact of Magnitude of Information	• Enabling and equalizing • Feeling Overwhelmed / Overloaded • Distracting
Pace of Work	• Increased pace and expectations • Increased mistakes • Reduced control through multitasking
Frustrations that Limit Engagement	• Difficulty finding data

	• Inability to use system
High Dependency on Data	• Complete dependency • Unstable • Credibility • Ensures survival
Collaboration	• Lack of certainty to contribute • Hesitancy to contribute • Removal of previous barriers • Membership to community • Sharing reduces effort & increases advancement
Increases Confidence	• Belief in information to help achieve end • Professional development and advantage • Confirms actions • Safeguards information beyond memory
Excitement to Embrace	• Amazement and wonder

The interviewees in general responded freely to the opening statement and questions. Across responses the researcher sensed an atmosphere of excitement, and in some cases of frustration, as the two overriding emotions present across all participants. It would seem to the researcher that the interviewees had predominately embraced net-centric technologies. However, they had given little thought as to the impact it was having on their work experience. This was evident with the short sentences that seemed to typify most responses, and that the researcher had to persist in many cases with helping the participants explore their thoughts and meaning, related to this technology.

When reviewing this result section, the limitations of using qualitative analysis should be borne in mind, being, that the factors of the present study may render it atypical (Wolcott, 2009). Thus, generalization is limited due to results being specific to the individual participants in a specific location, time and circumstance. Caution should

be given to moving towards general claims (Smith et al., 2009). However, as these potent themes were found across all cases and occupations, it is possible that this experience is shared of the phenomenon of net-centric systems. This in turn may indicate the finding of a shared experience that may be generalized. Smith et al. (2009) highlights it is possible to move to more general claims with IPA.

The main aim of IPA is to understand the essence of a phenomenon from the participant's perspective (Willig, 2004). And, the IPA researcher should aim to follow the participant in novel and unanticipated directions as the story of their experience unfolds (Smith & Osborn, 2008). Thus, presented interpretations are provisional rather than absolute or definitive, as the researcher cannot totally escape their own experiences and their associated bias (Larkin, Watts & Clifton, 2006). The researcher aims to provide a plausible set of results rather than a definitive analysis. Another researcher would probably provide a different interpretation due to the importance of the framework from which interpretation are made ("Brunel University London", 2013).

With this in mind, this section will focus on presenting the participant's experience through quotation from the transcriptions (referenced before each extract is the interviewee identifier, for example TE is the teacher (see Table 4.1), and transcript line number), and follow these with observation and interpretation from the researcher. In the extracts 'I' represents the interviewer or researcher and 'R' represents the respondent or interviewee. The researcher decided to present super-ordinate themes with supporting responses from cases, rather than cases with supported themes. The rationale for this was that it enabled the presentation of the

super-ordinate themes as a framework facilitating clearer understanding of the themes across cases. The researcher will now detail the super-ordinate themes, and supporting extracts, resultant from the IPA process (see Appendix H for an example of an opening statement and questions).

Super-ordinate 1: Impact of Magnitude of Information Available

This theme addresses both the realization of, and the response to, the massive volumes of data that are now available using this medium. While interviewing, and in the process of analysis, it was quite evident that the respondents were very conscious of the sheer volume of information available. In some occupations the extent of this was purely within their organizational barriers. In other cases the boundaries were extended to communities that were established for a particular profession. For example, by a governing body that linked in a multitude of other networks that were determined as useful. In some cases, there were particular forums that were being used as part of the daily job.

(Participant TE-18 & 30)

R: Err, we've created our own way within our school environment where we have got a bank where we save stuff and deposit stuff as we generate things, and it's accessible to everybody, and sometimes we make it accessible to the kids [pupils], and that makes it amazing. So, in terms of what's available compared to what used to be, it is ten times more, and because of that you're just so much more...um...

[…]

R: ...where it has everything from clips and books, to movies to blogs that people have that you can access...

This response was recorded as rapid in pace, with what was perceived as a mounting excitement and pride associated with the extent of data available in their established schools electronic community. TE explicitly speaks of the amount of data being estimated at 'ten times more' than there was previously. They also speak of accessibility to everyone, even the 'kids', so that information is freely available to the community and indeed forms its own electronic community. Also mentioned is the living nature of the information as it is captured, saved, deposited and even generated by the contributors feeding the repository that everyone shares access to. Later TE mentions some of the mediums that are captured, representing a diversity of information types available. The fact that what is present is an open and equal access repository which is experienced as 'makes it amazing'. These statements seem to convey an attitude of positive engagement with the proud creation of a repository that is vast, open, equal, varied and exciting with which to engage in.

However, in many of the interviews the volume of information was perceived as difficult to deal with and overwhelming. The following extracts aim to provide a sense of this shared negative perception. In this context, DC was discussing trying to utilize the information:

(Participant DC-53)

R: … […] there is the drawback that you become a bit swamped.

I: Yeah.

R: Because if, I would prefer to read through a hard copy file because you can digest it, but if you've got all this

information you can become overloaded and side-tracked by minutiae…

I: Yeah.

R: … because you see something that's out of place and then you get, you get off track…

I: Yeah.

R: … and follow that which is totally irrelevant, it has nothing to do with what you're doing at the moment and I think that it's a side, side issue.

I: Yeah.

R: It detracts from your focus.

DC uses the word 'swamped' that the researcher understood as representing being overloaded, as later explicitly confirmed by DC, and somehow trapped in the data, as opposed to being able to navigate easily through the data. They said they would prefer to read a hard copy as it was easier to 'digest', and this could mean to understand and make useful to the situation. They impressed the granularity of the information as 'minutiae' that gives a certain sense of the trivial and high level of unrequired details they are presented with. While working with so much information they mention the tendency to go 'off track' that interrupts or 'detracts' their focus from the task into 'totally irrelevant' areas. The researcher understood this as not related to the work task, and resulting in a distraction impacting efficiency of a work task.

It is important to note that DC had been discussing the 'enabling' nature of having information to resolve queries, and then they moved the conversation into something

that was detrimental to their ability to work. These two ideas seem to be diametrically opposed. As conveyed in the interviews across cases, this was not an unusual situation. As perceived by the researcher, both benefits and drawbacks were identified with having so much data, the drawbacks were however prevalent and seemed to create the strongest reaction. The overall impression was one of ambivalence at times. This stronger negative reaction is presented below:

(Participant DC-89)

R: It's, you can get quite frantic because you've got a large amount of data and you're trying to get, turn the call over quickly…

I: Yeah.

R: … so you're trying to condense it down and if you cock it up or if you make a mistake then it also provides the debtor an opportunity to come back and raise more queries because you misinterpreted the information, because you've got too much.

I: Yeah.

R: And we have had that on a number of occasions…

I: Yeah.

R: … where it's sort of, that old analogy give someone enough rope and they'll end up hang, give someone enough rope and they'll hang themselves.

I: Yeah.

R: It's a bit like that with some of the data as well because we've got, in some cases, way too much information and you can

trip yourself up very easily if you're not careful with what you're doing.

DC conveys the 'frantic' state as out of control, and therefore potentially being at risk to achieve their job goals as a direct result from information overload. It seemed to convey exasperation. Indeed, they then convey the impact of this state as resulting in frequent mistakes. They invoke an image through an analogy of being at significant risk, hung by themselves due to having so much information to process. It would seem that dealing with so much information is perceived as a risk that has indeed happened on occasions where mistakes have impacted the business.

The amount of information was highlighted as causing unwanted and difficult to control distractions. In many cases this loss of focus was reflected upon. Here are some extracts and the researcher's notes. It seems appropriate to note that this finding was one that was bracketed by the researcher (See Appendix I):

(Participant TE-80 & 148)

R: I find you actually get lost in...[…]

I: Yeah.

R: ...because what you are doing is you're accessing certain things that you are looking for, and then that leads you to paths that are two different things, and before you know you're actually studying something completely different than what you actually initially started. So it is quite distracting sometimes, and you need to literally focus on what you need to do, and...but, um, if time is of the essence...

I: Yeah.

R: ...and you have to do something quickly, then it is fast yes, because then you can limit yourself. But because of the vast amount of knowledge that is available, you do get side-tracked.

[…..]

R: But, the negative to that is, um, I don't know, like I say you get side tracked, you get so your time management goes for a ball.

TE talks of getting 'lost' in all the information available with the impacts that they are distracted onto a different topic of investigation. They speak of having to control their attention to 'literally focus' on the task, and this required effort to do so. The researcher perceived a sense of conscious restraint that was required to stay on track. When presented with lots of information they highlighted that their time management is very detrimentally impacted. 'Goes for a ball' is a colloquial saying for very negatively impacted. The researcher in this extract perceived the frustration, control required and potential negative impact of information overload.

The following extract refers to a similar response in another interviewee:

(Participant IT-585 &588)

R: But it is useful, I think any information's useful, all in…and the more information the better, and you can get information overload…

[…]

R: I think it's…I wouldn't…I do experience…if I'm trying to look for something specific, then I don't, I think the more views you get on it the better and then you see if it's leaning one way or leaning to another way…

I: Yeah.

R: …because sometimes it is say a de facto fact but a lot of the stuff is just people's opinions on what they think it might be and it's a matter of reading it and processing it and then it is…

This extract also refers to the concept of feeling overloaded by information. However, upon further discussion they reveal that the repository allows them to have more information available that then challenges their own opinion or viewpoint. They use the word 'stuff' and 'just' that led the researcher to assess that the information is not perceived as valuable, so again although it was stated as good to have all the information it perhaps was more quantity than quality. Therefore, still an experience that was lacking in value.

Super-ordinate 2: Pace of Work Changed

With the accessibility and speed of information availability increasing it is rational that expectations around the pace of utilizing this information has changed in the workplace. Indeed there was a sense across respondents that the pace of work had increased. This theme was found to be both explicitly stated or merely implied by the respondents. There were mixed reactions to this change in pace, some seeming quite positive, and others that were perceived as negative.

(Participant TE-74)

R: And you don't have to go through so much quantity to actually get to the quality stuff.

I: Yeah.

R: Because you can access the quality immediately, you can see what is relevant and what is not and...

I: Yeah.

R: ...it's faster. So it is faster, definitely.

TE felt the immediacy of information for them to process, and perceived that what was being presented for them to deal with was quite high in quality, with the comment on not having to struggle too much to get to 'quality stuff'. This enabled them to see what was 'relevant' immediately and so the perception was that this part of the job was much faster than before. The perception of an increased pace was definite in the verbal affirmation at the end of the extract.

(Participant MS-83)

R: So it saves er my rehearsals because nobody…er we just don't like sitting around and trying to play through stuff, it really bores other musicians to death you know, because they can't do the, you know…if it's Brown Eyed Girl and you know, nobody knew it, it would be really frustrating, such a simple sort of thing to do, do you know what I mean?

I: I suppose…

R: So we cut out a lot of the work as a group by doing it individually so…and when you go to the gig, you're expected to know, within reason, um the bits that you're doing.

Here the increase in work pace has been enabled by sharing music as electronic data with the impact of removing the need for ‘sitting around’ in a rehearsal scenario as they would normally do if this data was not available. This person says this removes the frustration of wasting time waiting on others learning their parts to the music. Instead they work collaboratively over the repository, thus, making work more effective and faster.

(Participant CE-309 & 313)

R: So they take a wee while to come in, you know. But anything else that we deal with, bigger firms, it’s all done, chop chop, it’s a lot quicker, you know. Most of what I can do in...oh, probably about two and a half hours I can do most of the stuff

[…]

R: Oh yeah, it’s speeded the job up, speeded the job up...

CE notes that mainly larger firms are using this method of contacting their company. When this does happen he uses the phrase ‘chop chop’ to denote a rapid movement of finalising a quick action in response to the in-coming data. Using the medium in this case has increased the rate of work by reducing what was normally done in a whole day to approximately 2 hours. As the working day is still the same amount of hours, the researcher can see and understand the increased pace of work and productivity.

(Participant IT-1001)

R: I think it’s useful. I think it’s changed to what…in a way it’s made us much more efficient.

I: Yeah.

R: Because we can process things much more quickly, in a way it's, you know, the whole expectation and that's not necessarily a bad thing.

The last extract shows some hesitancy in understanding if this way of working is really beneficial to them. However, they make a decision that they can indeed process things faster and so the pace of work has increased. They are not totally comfortable with this, and they allude to the employee's expectations as having changed. They still remain uncertain in this last response about expectations, and the researcher sensed that they were trying to decide whether these expectations were acceptable or achievable.

All the above examples talk about engaging with net-centric systems information that results in the faster processing of job related information and reduced time required. The researcher has interpreted this data as having an impact on the pace of work, making it more effective and less frustrating. There is still a level of uncertainty in some cases as to how to accept this increase in pace.

Another aspect of work that has changed due to net-centric systems is the perceptions regarding the increased pace of their work due to the increased speed of availability to net-centric systems.

(Participant IT-95 & 215)

R: …and with it…the information coming immediately you are under pressure to have to respond much quicker than you used to be

[…]

R: […] but it's made…in a way it's…it's made us all expect something immediately.

In this extract there are a few things commented on by the interviewee. Firstly, the pace at which information, which they need to process, is being created, and the feelings of pressure to respond are much faster than they had to in the past. The whole pace of working has increased as the information has increased. Another impression interpreted by the researcher is that the expectations have also increased from others for people to respond in a shorter time frame. This adds pressure to increase the pace not only from within the individual, but also from external sources. This may be indicative that the environment is externally controlled through these expectations that everyone is perceived as sharing. This quote highlights the associated pace increase of the whole system or 'us all' that is dependent on data availability and accessibility.

Working faster and with more data is also problematic to people:

(Participant DC-447)

R: […] the thing is the more work you do the more mistakes you're going to make.

[…]

R: It's that old analogy of there are more air accidents today than there ever were in the past. There again there are more planes in the sky than there were twenty years ago.

I: Yeah.

R: So I suppose errors are inherent, there will be more errors as our workload increases.

DC highlights the negative impacts of the increased pace of work as inevitable in leading to more mistakes as a general statement, so, a lack of belief that faster is a positive thing is present. They draw a parallel of progress with reference to planes and accidents. This could be interpreted that technology has drawbacks that impact safety, or perhaps an impact to their own safety in their job as a result of an error of not being able to cope with more data.

(Participant IT-71)

R: I find you've got to do that, you've either got to respond quickly so it does make you…like a sort of grasshopper, so you're hopping from one to the other so if something does come…

Here IT speaks of their 'hopping' between tasks in what is perceived as a fast and uncontrolled fashion. This comment provides a sense of behaving in a reactive as opposed to a focused manner, as they 'hop' about spending as little time on things as possible before they need to 'hop' their attention to react to something else.

Super-ordinate 3: Frustrations that Limit Engagement

There were a number of areas of frustration detected by the researcher during the analysis process, and indeed even during the interviews themselves. These frustrations seemed to have limited the ability to use the medium. There were a few main areas to highlight, such as many interviewees found it difficult to locate data on the system:

(Participant CE-529)

R: You've just to go know where to find it.

CE knew where all the data was for their division of work, but in the context of this response they were aware that many other people could not find data when required. This hampered their ability to be effective, and caused a frustration for the person interviewed, as they felt they were spending more time with people trying to explain where things were.

Although the idea of having an information repository was seen as positive, and even described below as a great idea, this person quickly moves on to the fact they cannot find what they want. Frustration was detected at this moment, as finding their required answers was a struggle:

(Participant IT-289 & 311)

R: I think to have a central information store is a great idea, it's just about having easy access to it and having a great system so you can actually find what you want.

I: So you find you can't find…you can't find what you want.

R: I find it difficult to find what I want.

[…]

R: I find our system is a little bit difficult in that respect. And again they…they give you a system and perhaps it's just a lack of training, maybe that's something that, you know, people would benefit from…

Another item that came up frequently was the perceived lack of ability to be able to use the systems storing the information. This was not reported by all candidates, but was definitely touched on by the majority as a failing of the adoption of the system that is causing a frustration to people. Some examples follow:

(Participant CE-181 & 397)

R: ...tell them to go look for it. I said, 'if you don't go look for it, it doesn't matter if I'm not here or if...and the guys takes over from me and he's not here, you've got to be able to find that information, you know.'

[…]

R: He says, 'well, I don't know how to even, how to start this up.'

I said, 'so it's all bullshit,

The first extract was spoken with a sense of frustration as the lack of ability of the team to use the system to find the required information. In the second extract, CE is recalling an interchange between him and his manager when they are discussing how to get to the information. Here the person describes

that they do not know even the basics of operating the system, and then anger is perceived in their rejection of the system in saying 'it's all bullshit'. This is perhaps a more extreme case of not having the ability to access the system that has perhaps turned into a negative attitude towards engaging with the system.

(Participant MS-166)

R: other downside is if you don't know how to work them properly

Again this extract makes it clear that not knowing how to use the systems is a 'downside'. It was noted that across most occupations, even including Information Technology, there was an evident struggle with using the technology.

Super-ordinate 4: High Dependence on Data

The researcher, in some cases, explored what would be the impact of not having access to net-centric data. In other cases the topic came up as a natural part of the discussion. Responses showed a high dependence on this type of data within the work environment for job tasks. There was in some cases a sense of not being able to survive without this technology, as the following example illustrates:

(Participant DC-379)

R: We would be quite literally stuffed, like a fish out of water, that become more, eh, actually our business has now become sort of, now become dependent on these, if you removed them from the company we'd probably fall over, or fold up.

The analogy presented by DC is one of not being able to ‘breathe’, as in the fish is removed from the environment that gives it life, being the water. They also spoke of falling over. Both these statements indicate to the researcher the perceived importance, and therefore dependence, on this type of technology for this person to not only do their job, but for the company to be able to operate. This potential reliance puts both DC and the company, with the usage of ‘we’, as belonging and representing the company, at risk of metaphorical death due to the high dependency on the pervasiveness of net-centric system based technology.

The IT interviewee below speaks of the importance of this type of technology as a center for information that is an ‘absolute essential’ in terms of being able to do their job:

(Participant IT-513)

R: I think it’s an absolute essential now because that information on competition, on what’s happening, on anything is there […]

IT gives the impression to the researcher that this repository is the place to go for all information, and from this the high reliance on this type of repository is named as ‘absolute essential’.

This high reliance on access to net- centric systems creates an emotional reaction when the technology is not available. In this case, frustration, is perceived from the tone of the response, and is explicitly stated by the interviewee. This frustration

resonated with the researcher as an emotion that came to mind and was bracketed in Appendix I.

(Participant MS-160 & 166)

R: Yes. It wastes a lot of time.

I: Does it? How do you know…how do manage to…?

R: It wastes a lot of time because they start to pack up occasionally and that…

I: Oh, you mean that

R: …is so frustrating…

[…]

R: You're relying on it so much that um when it doesn't work properly it's really frustrating. You know if you've got…someone's sent you a set list or a list of songs and they've got some specific parts that you've got to look at and the PC won't work or it won't print it out or you know, they…that sort of thing is so frustrating I can't tell you.

MS also states that this lack of availability leads to feeling that they are 'wasting time', i.e. time that is not productive while in a negative state of frustration.

An additional risk of being so dependent is that of having professional credibility undermined by data that is inaccurate.

(Participant IT-409)

R: …information and you know you've got to pretty much be 99 per cent right in what you're saying.

I: Yeah.

R: 'Cos otherwise you can go to a meeting and say, look, we do this and the competitor doesn't and someone can say well no you're wrong and then that would…

I: So…

R: …completely undermine anything you're trying to…

I: Yeah.

R: …achieve, and a lot of what we try and have is credibility and work with our customers and you need to achieve credibility really one way achieve that on the fact of what you know and if you're seen to be not very credible because you're saying, oh we don't…

I: Yeah.

R: …we do that and they don't do that and it's hard, it's not great to do that type of…

IT feels that the ability to be credible is an important aspect of their job, and inaccuracy poses a risk to doing business with their customers, by impacting their integrity. Therefore, dependence on the integrity of the published data is directly related to the ability to do their job.

There were various levels of dependence found within the responses, some actually involving human survival. One of the occupations presented a high risk of danger to human life through responsibility for health and safety. They perceived this type of information repository as vital to protecting life when dealing with equipment:

(Participant CE-335)

R: The reason I insisted erm, that we fill it in, and the guys haven't been lax at all, is because if something goes wrong, the first thing they come to us and say, 'when did you do the maintenance?'

I: Yeah.

R: Now, if you don't have a record of that, then you're floundering.

I: Yeah.

R: Especially if something blows up, or somebody gets injured, or something doesn't work right.

I: Yeah.

R: I mean it's people's lives you're dealing with.

CE, the manager, 'insists' that the data captured electronically on the network is shared to all staff working on the equipment. The researcher has a sense of them stressing the importance of this information being available when they said 'it's people's lives you're dealing with'. In this case it not only supports the job being done but it reduces the 'floundering' understood as 'risk' to the researcher as well as directly impacting the preservation of life.

Super-ordinate 5: Collaboration

Throughout the interviews, collaboration was a topic that frequently arose without the researcher directly asking questions on the topic. There were varying views on collaborating through repositories, contribution, and collaboration by accessing these repositories.

IT speaks about their thoughts on collaboration:

(Participant IT-535)

R: […]I find that all the forums that are set up and we're trying as a company to set up user forums…

I: Yeah.

R: …not been very successful…

I: Yeah.

R: …not quite sure why, I think we've just not promoted it but I would say that in all areas of our business where we try to interact with our user forums we don't get a lot of responses as people maybe have looked at it, or looking to find answers rather than publishing answers.

I: So…oh right, so it's about taking rather than contributing back?

R: Yeah, people…yeah, it takes a long time to contribute back and you've got to really want to do it, people will just look for information, I suppose from personally I will contribute back to some forums from a work perspective, I'd look at any, but

have I contributed back, probably not and I suppose I wouldn't really know where to do it, we have as I say got some forums but we haven't…you know, they're not really promoted as best they should be…

I: Yeah.

R: …I think it would be great if we could if we did it in a structured way, a proper methodology of…

[…]

R: …it's just it's…it's there, do something.

[…]

R: Yeah, and what they expect us to do and you think, well if I publish something, there's nothing else there [laughs].

I: Yeah.

R: So, you know, why am I doing it [laughs] and no-one else is.

IT touched on a number of areas regarding collaborating on forums. Overall, they spoke of a lack of certainty regarding how to publish, and that forums were not well promoted. They also highlighted the aspect of looking at, taking, from forums rather than giving, publishing, information to forums. The researcher sensed that perhaps the motivation to publish was a challenge when the interviewee said 'you've really got to really want to do it'. However, there seemed to be a sense of perhaps duty to publish when they said 'it's there, do something', followed by 'what they expect'. The researcher sensed a need to respond as perceived by 'they' perhaps being management of the company that has created an expectation, and hence the researcher interpreted this as a sense of duty. However, there is a statement of

reality in that ‘there is nothing else here’ (with a laugh), that sounded like ridicule and then ITs’ reaction of not contributing as ‘no-one else is’. From this interchange, the researcher finds a conflict of requiring information from forums coupled with the perception that there had been no clarity of *how to* from the creators. This may be the reason why they are not contributing and so nobody else is. The researcher sensed a lack of ownership of the forum within the organization, as perceived by the interviewee.

Another aspect of collaboration was the opening of previous barriers to knowledge, for example:

(Participant TE-14)

R: But in terms of research it’s an amazing tool, um, for us it’s quick research and there’s so much that you can share because, um, for me to share with my colleagues in Cape Town, you know, in Johannesburg it used to be a mission because you had to fax it, or you had to, err, get it mailed or something like that.

I: Yeah, sure.

R: Nowadays it’s just a click of a button away and you’ve got resources available from all over the world. And there is amazing resources that you can use.

I: Yeah.

R: Err, we’ve created our own way within our school environment where we have got a bank where we save stuff and deposit stuff as we generate things, and it’s accessible to everybody, and sometimes we make it

accessible to the kids, and that makes it amazing. So, in terms of what's available compared to what used to be, it is ten times more, and because of that you're just so much more...um...

[…]

R: Well its confirmation in the first place of what you are doing is the right thing...

[…]

R: Yes, and not just that, but because we can share so much more and it makes it faster. Um, it, um, resources, for instance, when we do draw up assessment tools for certain tasks, okay, we can share the assessment tool, okay, without having to go out. You don't have to reinvent the wheel kind of thing; everybody doesn't have to reinvent the wheel.

TE outlines a sense of collaboration on a number of different levels. Firstly, they speak of the collaboration during research to contact people who are in other cities and the ease with which they can achieve this contact, contrasted with past methods. They spoke with what the researcher perceived as excitement, that the resources available are 'amazing' and there was a sense of another world opening up to them as a teacher.

On another level, there was the sense of collaboration facilitated between the campus staff and this also extended to the pupils. This collaboration was discussed under a 'we've' and an 'our' which to the researcher created a sense of community with a boundary, and also the 'our' could indicate ownership. This data within the school environment leads to much more data being available to everyone. This

sounds like a truly open collaboration to the researcher. The researcher noted that TE used the word ‘amazing’ repeatedly, and this conveyed a sense of wonder, excitement and pride to the researcher during the interview.

TE identified this collaboration saves them ‘reinventing the wheel’ and tasks can be accomplished without leaving school campus. These can be achieved with less effort.

(Participant TE-38 & 64)

R: So I can directly contact the writer...

I: Yeah, and ask questions and...

R: ...and go into a conversation with him, um, but actually it’s in his blog or whatever, and you know, it’s amazing

[…]

R: I feel more hands on; I really feel that I’ve actually got the knowledge at the tip of my fingers.

(Participant IT-631)

R: I would say it’s…yeah, it makes you more efficient, I would…yeah, because as I say in the past you might have had to go…and you know, I’ve done, go to a library, go to try and find a reference manual, a hard copy of a manual you’ve got…

I: Yeah.

R: …things like that, I think having it there at your fingertips has made it…everybody pretty much more efficient…

In these cases the interviewee used the forum to get in direct contact with the writer and the information, and as a result of these types of abilities in both cases, they feel a connection through collaboration and perceive that the knowledge is in easy reach.

One of the results of open collaboration and sharing information has been reflected as:

(Participant CE-211 & 219)

R: I think it's made the job erm, I think it...to me it's, it's just spread the information around. I'm not one for holding information, I like to, I like to impart information; I'll tell everybody everything, you know. Some people like to hold it to themselves...

I: Yeah.

R: ...and think, wow, you know, my job's really important...excuse me...and I don't need to give it to anybody else. But I like to give it to everybody, wide, you know.

I: Yeah.

R: So tell everybody everything, and then they're all in the picture, and it helps...

I: Yeah.

R: ...everybody. They can say, 'oh yeah, no, we discussed that yesterday,' or, 'you know, you gave me that information,' I says, 'yeah, you know, you've got it all.'

[…]

R: And I think it puts a bit more harmony into the job, because then everybody knows, you know. Erm, you're no longer sitting, like the boss was, down in his office and everybody had to go down and phone him and, 'how ya doing,' and you know.' And then he would come up and talk to you. Now everybody can talk to everybody, so it's better, you know.

I: Yeah.

R: So far more freedom of information. Before it was all kind of held against, you know [clears throat], guys would go to the big, big boss guy, just down at city electric, he was the only one that could go into substations and adjust things for instance.

I: Right.

R: But now all that's all gone, you know what I mean; anybody can go in and do it, as long as you know what you're doing. But everybody's got the information.

The openness of information has also created a sense of collaboration through information sharing between the staff. Knowledge is freely available to all levels. This is seen to foster more harmony than was previously present in this working environment.

MS spoke of the collaboration increasing his knowledge in his subject area:

(Participant MS-150)

R: Just listen to the kids. Well it's like you bring a CD to me that I've never heard of before because there is so much out there and I get…a lot of my students delight in bringing me something that they've found from Canada[…] she would go surfing the net for foreign bands, bands from Canada, outer Mongolia, wherever but she had to have something that was new and different so she could say "Have you heard this?"

I: Oh right okay.

R: And it had to be different. Um, now, those bands are coming through, which…I mean that's what happens but I mean the kids are just phenomenal, they just bring stuff in and they say "Have you heard this? Can we do this?" and um, which is good because I learn…I listen to a lot more stuff than I would have done I guess, but I'm always keen to learn or listen to stuff anyway so it…you know, I wouldn't sort of say "Nope, it's the Beatles when you come here".

MS highlights the ability that net-centric systems enable people to collaborate on unusual music, so increasing their musical knowledge

Collaboration in some cases led to a sense of being connected to others most of the time:

(Participant MS-264 & 271)

R: No I don't think so because I'm…if…I'm guessing that I do use it quite a lot more than I…I don't…I never shut down

really, in a sense you know, that's the only thing about it, um if I'm waiting for something to come through, from somebody then it doesn't you know, I go and have my tea or watch the telly or you know, kick the dog and then come back in and check […] you're sort of drawn to it, too often, to come in and check.

[…]

I: It's not like you can shutter off kind of thing, is that what you're saying?

R: Yeah. No you can't always can you so it's always there but um apart from that I think it's…for me it works well.

This person speaks of feeling continually connected through collaboration by being drawn to check for a response. It is something they find is continually on their mind in certain circumstances. However, they seem to manage this feeling of continued connection and work it into their normal life, which upon reflection works well for them.

Super-ordinate 6: Increases Confidence

Many of the interviewees reported that having access to this data on their job provided them with a sense of confidence. The researcher concluded this through what they said and their tone of response. There is the confidence of having access to answers, through the availability of information:

(Participant IT-609 & 611)

R: …there is a lot of information out there, I think that's probably the biggest benefit to everybody, I think I was having to…you know, if you have got a problem the information and the answer is out there…

[…]

R: The answer…the truth is out there, you might have to sift through a lot of rubbish trying to find it…

I: Yeah.

R: …but it's very rare that you would not be able to find the answer, sometimes you can't but you get an understanding of a bit more about what the problem is.

I: Yeah.

R: And it might not be a direct answer to your problem but it might be, you know, leaning towards it to give you a little steer…

This respondent gives the impression of confidence in their ability to do their job by answering questions from the repositories, as supported by their belief that the information is somewhere on the forum. They are confident that even if a definitive answer is not there, they are still able to develop their understanding of the topic through a 'steer' based on what is discovered in the data presented. They are willing to persevere in their belief of useful knowledge, even if it means going through information that is to them useless and time consuming. This leads the researcher to believe that access to this information has created support for the person and that has led to feeling more confident in their ability to do their job. This extract also portrays the positive attitude to embracing this technology.

When asked the extent of the assistance through having access to the phenomenon this person said:

(Participant TE-184)

R: I can actually save lives just because of that [being electronic and shared].

I: You can?

R: Because, um, the parent information, the doctor's information, the medical aid numbers, all those kind of things are available. If a boy gets injured on the sports field, I immediately have access to that kind of information. I can take him to hospital immediately, I can hospitalize him, you don't first have to get hold of the parent and then try and get to the stuff, that actually saves lives, okay, literally, um, that's one benefit. The other thing is, if you need to let a parent know about concerns that you have about a child, that kind of access is immediately available.

I: Yeah.

R: In terms of newsletters that we send out in the school, um, and we want parents to know something, its immediate, it's there, okay. Within minutes after we want to say something to parents it's there.

I: Yeah.

R: It doesn't have to take the tedious route of through the postal system or whatever, it's so amazing.

When TE was responding to this question the researcher sensed a growing sense of excitement and their belief in the importance of this medium to enable them to keep their pupils safe, respond quickly to a crisis and make parents immediately aware of a situation. They also state the old systems as being 'tedious' by contrast to the new net-centric system way of working on their desktop and hand-held devices. This ability provides them with confidence to react quickly and appropriately to potential situations on their job where they are responsible for children in their care. It is understood as confidence through the removal of risk.

(Participant DC- 469)

R: It does give you a bit of an edge and more leverage

The person felt empowered and elevated by the phenomenon that in turn enabled them to speak with confidence, and be confident in their ability to carry out their job tasks. In this context the access to information and their ability to use it provides a valued added professional advantage. This supports them as a place to leverage, providing them a strong foothold from which to operate with confidence.

Another sub-theme frequently encountered was that of the ability to professionally develop the skill set required for the job through the phenomenon:

(Participant TE-26 & 144)

R: […] you share such creative things like creative ideas that that person is using and you never thought of, so you're actually improving your own teaching techniques, your own skills that you have by accessing these things.

[…]

R: And for that purpose I think, um, it has made me a better teacher, err, because I've got more to refer to.

I: Yeah.

R: The original framework has expanded and therefore, um, I think I've got more to offer...

Here the respondent highlights that they feel they have become a better teacher as the result of sharing creative ideas with others through net-centric systems. Having this ability has broadened their own ideas by linking into the creative streams of others that are placed on the repository, and can be contacted through the medium for consultation. This has boosted their belief in their experience, and therefore what they have to offer, to the school, based on personal development. They have developed by expanding their interactions.

(Participant MS-128 & 134)

R: Um, it's made me a better musician.

[…]

R: …which is good because I learn…I listen to a lot more stuff than I would have done I guess, but I'm always keen to learn or listen to stuff anyway so it…you know

Again, with this extract the researcher feels a sense of an increased exposure available on the medium, which is coupled with a motivation to increase experience through sharing. In the researcher's opinion, this person was energized about having this ability, and that it progresses them in their job role and makes them better as a musician.

(Participant TE-22 & 68)

R: Well its confirmation in the first place of what you are doing is the right thing...

I: Yeah.

R: ...because you see someone else is doing the same kind of thing in a different part of the world.

[…]

R: And um, it's I suppose an affirmation of what I'm doing is right...

I: Yeah.

R: ...err, where in the past it was my...you're on your own and you're trying to just do what you think is right. Now you know you're right.

I: Yeah.

R: So it's a positive thing, um, in terms of what we provide. The quality that we provide is so much better.

Here TE speaks of the confirmation that he feels by connecting on the forum that what he is doing in his occupational role is correct. He reflects on the past when he felt more isolated and working in a way that was not validated by others as 'right'. Now he can validate his methods, and that provides him with a sense that the quality of what he does has increased. This leads to a sense of confidence in his methods and abilities.

(Participant IT-621)

R: …and then deciding…using your own experience and judgment to work out, well, yeah, I'm absolutely going to believe that or well I think that's right but I'm just going to get some other points of reference

Here IT speaks of blending their own experience with the knowledge they find on the repository in order to check their own thinking, and provide them with more belief in their opinions, so creating confidence in their role.

The next sub-theme explores the subject of less reliance on memory and a safety associated with recording things electronically:

(Participant CE-183)

R: 'You don't need to keep it inside your noggin, but as long as you know where to go and find it,' and that's what I've found is the key thing. If the boss asks me something, I'll just say, 'I'm not sure, just hang on, I'll just go and look in the computer and come back,'

This person gives the impression that there is less dependence upon being able to retain and access knowledge from their and other's brains, and that this is now available on the repository. This gave the researcher the impression that this was a relief and a more secure way of working with data. However, the interviewee did mention that you still need to be able to locate the data on the system, and also highlights that retrieving the data is quite a fast process.

Another aspect that was interpreted as reducing exposure to risk, and so, increasing confidence in the tasks, was the concept of using the repository as a safeguarding mechanism.

(Participant DC-235)

R: *Well it's, it's sort of like error checking and the saying that, you know, is it two heads are better than one…*

In the context of sharing ideas and supporting each other through the usage of the repository, this person checks their actions are valid through other people's review. And, reducing the risk of them having to take all the responsibility of their actions. Through this check their action is supported by another person, providing them with more professional confidence.

(Participant CE-97)

R: *Notify the consultants; speak to them, get times and dates of where to meet them, you know. So I find that fine, I find that great, a great medium, to, to communicate, you know. Plus you've got a record, you know.*

Here this person speaks of using the repository for a specific purpose of notification. In relation to this they note that in doing this through this medium they are creating a point of recorded reference to reduce confusion and risk thus making them feel more confident in their future actions.

(Participant IT-457,461 & 469)

R: *It's used as a chain, a lot of people obviously keep a chain*

[…]

R: Just waiting to bring out in case there's this problems

[…]

R: you've got a record of it which not for finger pointing in the future but it is quite useful to have a record, but I think…

This person related to the sequence of sorted information as being a chain of evidence, if there are any problems, like an electronic safety net linking all parties together in agreement and recourse. They are careful to say that this is not necessarily for assigning blame or 'finger pointing' but can be useful for the sake of clarity.

Super-Ordinate 7: Excitement to Embrace

Across all respondents there was a palpable atmosphere of excitement around the capabilities of the phenomena within the workplace. The researcher will attempt to convey some of the statements that most closely reflect in writing the energy that was perceived.

One of the most powerful comments that were made in terms of the impact of net–centric systems was the following:

(Participant IT-47)

R: It's revolutionized things

This person was smiling and had urgency in their voice when they said this to the researcher. They really did feel that the very nature of work had been changed as a result of this type of repository.

(Participant CE-201)

R: ... So it makes life easier, you know. And we store all that stuff...

This person had previously stated that their work time went from a whole day of activities down to only approximately 2 hours. They reinforced this view by saying that work life is much easier and less stressful. Again, below we can sense, and are indeed told directly that the work is reduced by being able to access others and their thoughts, as facilitated by repositories:

(Participant TE-232)

R: ...and just reading another writer's blog is already telling you more about this person, and that cuts down on the research that you have to go and do on what's actually making this poor guy tick.

I: Yeah.

R: If you want to go and analyze a text or want to interpret the stuff, so it's really amazing.

This person also displays the amazement they have for net-centric systems. To the researcher this is a positive perception of the media and conveys a

positive attitude to usage. Positive attitude and experience of data, and usage, is clear in the language of these participants. They are indeed amazed, and are clear about being so to the researcher during the interviews.

(Participant DC- 317)

R: Yeah, it's amazing […] it's amazing what the information you can pull up and you can use that to refine a search…

(Participant TE- 214)

R: And then the first one that comes up with it gets a prize or something like that, because he's followed the right channels and the routes, and then they will quickly come and tell me what it's all about, and they will cross reference certain stuff, which is quite amazing.

The power of linking things together through the repository is again stated as 'amazing' in both above examples. This was a word that was often used to capture the feeling associated with these repositories. To the researcher, this conveyed the difficult to believe impression of wonder, and awe, achieved through this phenomenon.

4.1 Summary of Results

During the analysis the researcher was aware of a need to understand if the overall experience of net-centric systems was a positive experience at work or a negative one. From the themes that have emerged in the majority of cases, the researcher experienced the feedback to be one of three categories; positive, negative or mixed. The emotional interpretation in relation to the various sub-themes is presented as a

summary in Table 5.4 below with RED as negative, GREEN as positive and ORANGE as unknown.

Table 5.4 *Summary of IPA Theme Results*

Super-ordinate Theme	Sub-Theme	Overall Perception*
1. Impact of Magnitude of Information	Enabling and equalising	
	Feeling Overwhelmed / Overloaded	
	Distracting	
2. Pace of Work	Increased pace and expectations	
	Increased mistakes	
	Reduced control through multitasking	
3. Frustrations that Limit Engagement	Difficulty finding data	
	Inability to use system	
4. High Dependency on Data	Complete dependency	
	Unstable	
	Credibility	
	Ensures survival	
5. Collaboration	Lack of certainty to contribute	
	Hesitancy to contribute	
	Removal of previous barriers	
	Membership to community	
	Sharing reduces effort & increases advancement	
6.Increases Confidence	Belief in information to help achieve end	
	Professional development and advantage	
	Confirms actions	
	Safeguards information beyond memory	
7.Excitement to Embrace	Amazement and wonder	

*Overall perception: **Green for an positive emotional experience**; **Red for a negative emotional experience**; **Orange for an unknown emotional experience**

From this brief summary, it can be seen that overall the themes predominately indicate a positive experience to the phenomenon of net-centric technologies in the workplace.

Now that the results of the qualitative study have been presented, a discussion of these results relating them to existing research, and theory, will be addressed in the Discussion chapter of this dissertation.

CHAPTER 6 - DISCUSSION

1 INTRODUCTION

This chapter concludes the reporting of the present study whose objective was to explore the research question:

How are net-centric systems experienced in a work context?

It starts by summarising and discussing the present study relevant to existing theory and research, both the qualitative and quantitative findings. It then moves onto consider the triangulation from their alignment, which it places into the context of any existing research related to the topic. The chapter then contemplates the implications to both practitioners and organisations, outlines the limitations of the study, and then highlights recommendations for future research. Finally, a summary of conclusions closes the chapter.

Although net-centric systems are engulfing our work experience in many occupational fields, there is a lack of focus in understanding this phenomenon in context. Indeed the researcher found no previous studies in this specific area. This drove the aim of the research to provide some exploration and understanding of net-centric systems within the researcher's workplace.

The research embraced two methodological approaches and their relevant techniques, both driven from a position of pragmatism firmly based on the requirement to answer practical questions through research (Tashakkori & Teddlie,

2003). Indeed, the complexity and pluralism of our contemporary world demands commitment to the usage of multiple methods and the fusion of methodologies (Greene & Caracelli, 1997a,b). The mixed method approach utilised a quantitative investigation that is based on testing theoretically formulated hypotheses, grounded in existing research, and a qualitative investigation that explores beyond any theoretical constraints in order to understand the phenomenon. These investigations were run in parallel, so findings did not influence, or create, bias in any part of the present study. Both these approaches will be recapped and their findings summarised, and discussed, in the following section.

2 SUMMARY AND DISCUSSION OF FINDINGS

2.1 Quantitative Stream

This strand of the present study aimed to test hypotheses constructed from an extensive literature review. Table 6.1 represents the hypotheses formulated.

Table 6.1 *Quantitative Hypotheses Summary*

H_1: The existence of TechnoStress reduces psychological well-being.
H_2: More frequent usage of net-centric systems lead to increased psychological well-being
H_3: Attitude to computer usage determines psychological well-being, such as a positive attitude to computers results in increased psychological well-being

A number of existing scales were selected in order to measure the variables. Stress induced by exposure to technology was measured using the Personal TechnoStress

Inventory (PTSI) developed by Weil and Rosen (1997). Attitude to computer engagement was captured through the Attitudes to Computer Usage (ATCU) instrument developed originally by Popovich, Hyde and Zakrajsek (1987) and revised by Morris et al. (2009). Psychological well-being was captured using Ryff's (1989, 1995) updated Scale of Psychological Well-being.

However, after conducting PCA, and reliability adjustments (using Cronbach's alpha finally ranging from .64 to .77), the existing scale items did not rotate around the expected components. Instead, they rotated around 7 new components. The scale that maintained most of its original grouping was the Scale of Psychological Well-being. However, not all items were included in the final components.

The new components resulted in the following independent variables:

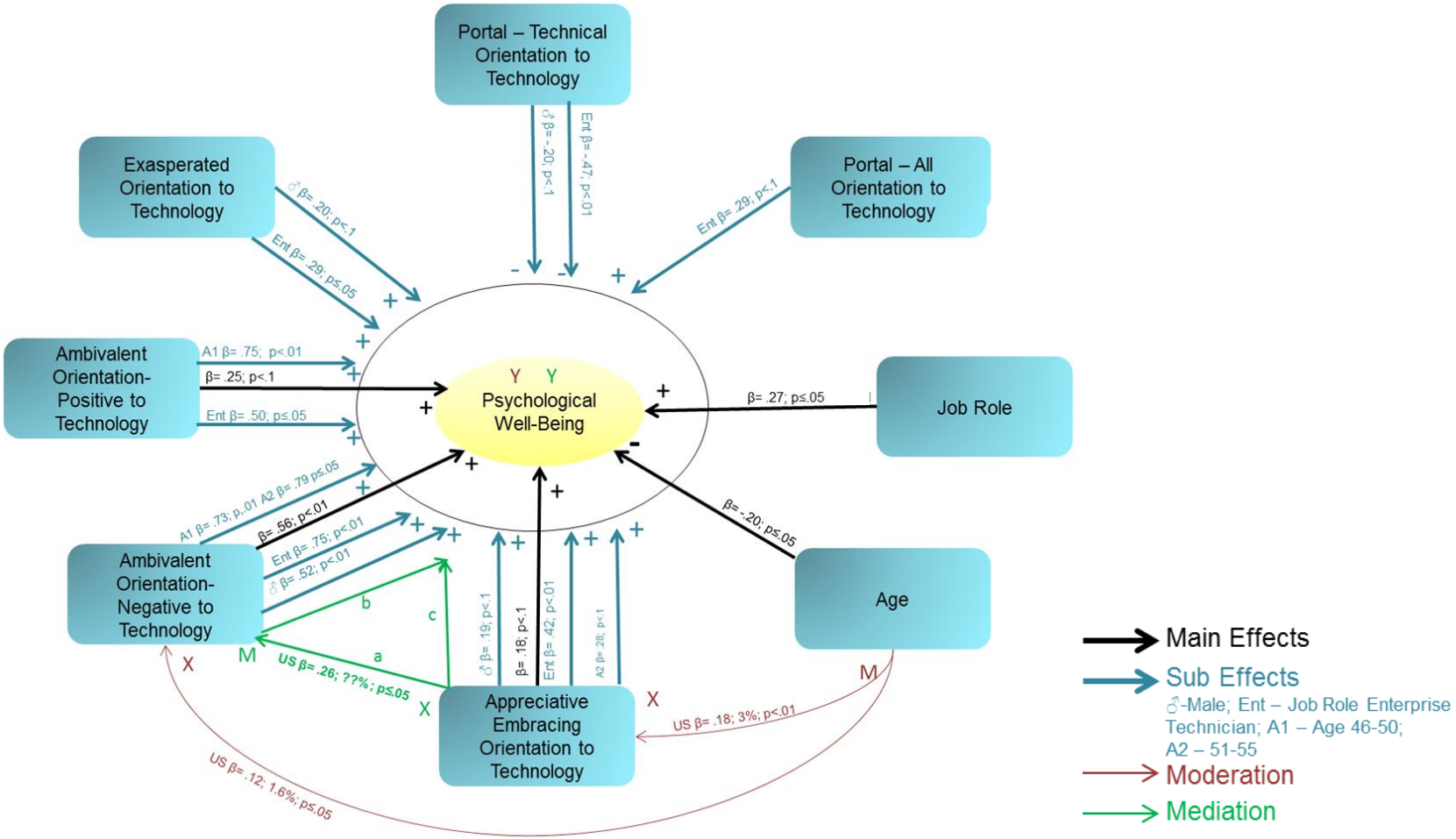
7. Ambivalent Orientation - Positive to Technology
8. Ambivalent Orientation - Negative to Technology
9. Exasperated Orientation to Technology
10. Portal - Technical Orientation to Technology
11. Portal - All Orientation to Technology
12. Appreciative Embracing Orientation to Technology

'Frequency of Usage' was added as the last independent variable. In addition to these variables, Job Role, Age and Gender were captured as a self-report for consideration as part of the analysis. The dependent variable was still represented by 'Psychological Well-Being'. At this point, the formulated hypotheses were

abandoned and the researcher chose to explore the variables at the level of the research question, previously stated.

The researcher then progressed to run multiple hierarchical regressions, moderation and mediation, between the independent and the dependent variables. These results, see Figure 6.1, will now be summarised and discussed.

Figure 6.1. Statistical relationship summary from quantitative results.



It is instantly evident from Figure 6.1 that 'Frequency of Usage' is not present as a statistically significant outcome. This was an unexpected finding of the research. It means that regardless of how frequently an employee uses net-centric systems, and in turn becomes more familiar and adept with their contents, that this interaction does not relate to psychological well-being.

With regards to 'Gender', as 87 per cent of the sample was male it was decided not to consider this in any further interactions. Remaining are the variables and their interactions for the aggregate and sub-populations.

2.1.1. Ambivalence

In the aggregate population, an ambivalent orientation, with both negative and positive aspects towards technology determines psychological well-being [adjusted R square = .22; F(6,106) = 4.23]. This seemed like a finding that is at odds with reason. However, ambivalence, although not widely researched in relation to net-centric technology, has been highlighted by Mick and Fournier (1998a) as a paradox of technology. This technological paradox was expanded by Buchanan-Oliver (2011) to eight polar opposites, such as here/ not-here and past/future. Buchanan-Oliver (2011) sees technological ambivalence as more profound than simply 'useful' or 'not', rather touching on how technology usage leads us to conceive ourselves as humans. Perhaps the finding of ambivalence represents the struggle for us to understand ourselves in relation to technology, and the uncertainties it presents. With reference to the qualitative study, it was perceived by the researcher that people had little awareness of the impact of net-centric systems on their work lives. This could be related to the same issue of ambivalence as they struggle to grasp the

phenomenon. As this construct is a new one to this research area, it is difficult to compare or contrast to other research findings in this area. This may be the first time in psychological research that this construct has been found in practice.

2.1.1.1 Negative Ambivalence

Even though the idea of ambivalence seems a new research construct established in the present study, and therefore perhaps psychological studies of technology, it shows many statistically significant relationships in the model represented in Figure 6.1. If the component items are reviewed, the reader may get a sense of 'scepticism' as represented by this aspect of ambivalence. Here technology is seen as problematic, time consuming and that 'older ways' of working are preferred, e.g. reading a physical book. Some related research is that of Ojiako, Chipulu, Maguire, Akinyemi, and Johnson (2012) where they refer to the concept of 'adoption reactance' in their research of mandatory system adoption. The present study net-centric system adoption was mandated. This concept is defined as a state of motivation adopted to restore autonomy in response to a perceived threat to an individual's independence of decision making (Silvia, 2005).

Karasek's (1979) model of stress accounts for situations in which the employee experiences high demand and low control, called job decision latitude. It is possible that a negative state of ambivalence is an expression of reactance due to the level of job decision latitude experienced within the organisation. As mentioned in the literature review perceptions of lack of workplace control cause stress (Spector, 1986). As this system was deployed with no consultation with employees, it is

probable that little control is perceived over its adoption. The potential existence of reactance, and job decision latitude, may create a state of negative ambivalence.

The construct of negative ambivalence echoes the concept of scepticism that Salanova et al. (2013) found to be a facet of TechnoStrain. Salanova et al. (2013) determined that the presence of TechoStrain leads to the creation of obstacles that hinder computer technology adoption.

It therefore follows that the experience of negative ambivalence may represent the existence of stress that can hinder the adoption of net-centric systems, resulting in an economic impact to the organisation.

Most of the many significant relationships for negative ambivalence will be discussed in the appropriate following sections. Negative ambivalence as a mediator will be discussed now.

As the two sides of ambivalence were split for practical reasons they were also analysed as such. This analysis discovered that the negative aspect mediates the relationship between an appreciative embracing attitude to technology and psychological well-being. Even when there is an attitude that is in favour of utilising technology, the scepticism for technology is still present and exerts an influence over psychological well-being. This finding is at odds with Vietez et al. (2001), who found a significant positive relationship between technological perception and psychological well-being. The present study has uncovered a negative perception mediating a positive orientation.

It is possible that initial assessment of the net-centric system has led to hesitancy to embrace this technology, and individuals are protecting themselves. One of the implications of this finding is that in the diffusion of innovation paradigm people who resist adoption, perhaps captured as a negative orientation to technology, may be doing so as a coping strategy for dealing with the pervasion on technology.
The self-protection could lead to feelings of more control over their environment and a resultant increase their sense of well-being as work. In Rogers (2003) diffusion of innovation theory, at the persuasion stage an attitude is formed, so the person becomes more psychologically involved with the innovation. Perhaps for this system people are currently assessing the innovation and their starting point is one of caution in order to minimise risk. This is a new contribution to research that requires more understanding in future research.

2.1.2. Appreciating and Embracing

When the relationship was investigated between having an appreciative and embracing attitude to net-centric systems and psychological well-being, it was established that this attitude indeed positively predicts psychological well-being [adjusted R square = .22; $F(6,106) = 4.23$]. This is in alignment with existing research, where a positive orientation leads to a positive experience of technology (Beckers & Schmidt, 2001) resulting in an increased sense of well-being.

In terms of Roger's (2003) theory of innovation it is likely that this attitude represents the completion of the persuasion process and the progression to the decision process with a resultant action to adopt the innovation.

2.1.3. The Impact of Job Role

When analysing the aggregate population it was established that as job role changes, from administration to management, so well-being improved [adjusted R square = .03; $F(4,112) = 1.96$; $p<.05$] in relation to net-centric technologies. There could be a number of determinates for this finding that were not captured in this research. For example does education or ambition play a part in the perceptions towards such systems? Or is this purely a function of the types of information that are available on these systems and its relationship with job function? Related research that may shed some light on this finding is limited. Bawden and Robinson conceptualise the 'information literate person' (2008, p.187) who has knowledge of the world of information, various approaches to working with it, and is a critical thinker. As the job roles change perhaps the people in the roles have more of these abilities due to the nature of their job. Igbaria (1993) found that education had a positive impact on the perception of usefulness of computer technology. If the researcher reviews the job roles relative to typically recruitment qualifications there is an increase in the qualifications as the job roles change.

In terms of Rogers' (2003) diffusion of innovation theory, research has found that the education profiles of the innovator positively shapes attitude towards technological innovations, such as the Cloud (Hoffman, Novak & Chatterjee, 1995; Li, Kuo & Russel, 1999).

From the analysis conducted on the sub-populations, it was determined that a particular job role, being an Enterprise Technician, demonstrated some specific relationships. This role deals with mainframe systems, typically in organisations

requiring scalable, secure, reliable and powerful computer systems. Although these people are ICT technicians they are trained in centralised systems, and so do not typically have extensive technical expertise in net-centric systems.

The Enterprise Technicians represented 51 per cent the sample captured. In this job role a considerable number of relationships were found. This begs the question as whether the sample was equally representative for the other roles; would the researcher have found further significant relationships for all job roles?

All the following findings showed relationships to psychological well-being [adjusted R square = .32; $F(6,54)=5.84$; $p<.01$] for the Enterprise Technician, leading the researcher to believe that if more samples were obtained for the other job roles then more significant relationships may have been found. The most impactful to business relationship found was that as their orientation to the technical portal increased so their well-being decreased. This finding was really concerning as this system was designed predominately for usage by the technicians. Accessing this system reduced their psychological well-being, and so potentially impacts their health at work. This has extensive implications for this role in relation to this net-centric system, which require further understanding and formulation of intervention.

Whereas, for the same job role when we look at the *general* net-centric system portal, for usage by all roles, we see usage of this system positively influences psychological well-being. That is where the portal was embraced for this role, it led to an increase in well-being at work.

Additionally, for the Enterprise Technician an interesting finding was related to their exasperated experience of net-centric systems. When exasperation was experienced there was an *improvement* in psychological well-being. This result is at odds with research investigating negative impacts of technology, such as the phenomenon of TechnoStress (Tarafdar et al., 2011; Ayyagari et al., 2011). Potential relevant explanations that have already been covered are job decision latitude, reactance and resistance of innovation as a coping strategy.

2.1.4. The Impact of Age

When analysing the aggregate population it was established that as age increased, so did psychological well-being decreased [adjusted R square = .22; $F(6,106) = 4.23$; $p \leq .05$]. In previous research on the Cloud and well-being the effects have not been statistically significant (Chen & Persson, 2002; Dickinson & Gregor, 2006; Huang, 2010). As age is significant in this aggregate sample, this may be a new contribution to the research area of the current study. However, this area requires more research to really understand the underlying reason for this finding.

Some of the sub-populations of age revealed some interesting findings. For people from 46 to 50 years old the existence of ambivalence led to improved well-being [adjusted R square = .47; $F(6,17) = .4.33$; $p < .01$]. However, this was not the case for any other age group of the sample. If we reflect on the advent of computers, then this age group, Generation X, would be one of the first groups to have experienced the start of the computer revolution in a large proportion of their job roles. People older than this group would probably have only experienced computers as predominant at work if they had a specific career in this field. People younger than

this age group would have been immersed in computer technology, and net-centric systems, from the beginning of their careers. This could mean that this research has discovered something particular about the first long term impact of using computer technology in work.

Again if we review Roger's (2003) diffusion of innovation process it is possible to understand different age reactions to net-centric technology as an innovation. To Generation X it may be seen as yet another aspect of innovation that they need to assess through the stages from 'Knowledge' to 'Confirmation'. However, to the younger employees they may not need to go through this same process as their expectations are perhaps different.

Additionally, for people in the age group of 51 to 55 years old it was established that when an appreciating and embracing attitude to net-centric systems existed, and was enhanced, so their psychological well-being increased.

Age was also found as a moderator. The first significant interaction was with the negative aspect of ambivalence. Here, out of the 17 per cent of the effect explained between an ambivalent orientation to technology and psychological well-being, the interaction of age with the negative side of ambivalence explains 1.6 per cent of the total variance. This could be an indication of the progress made in Roger's (2003) diffusion of innovation process.

The second interaction, between age and an appreciative and embracing orientation to technology, found that out of the 10 per cent of the effect explained between the variables the interaction of age and appreciating attitude explains 3 per cent of the

total variance. So, age plays a role in the existence of well-being even when attitude is positive.

Although both moderation influences could be considered small, age is still a significant determinate in the relationship with psychological well-being. These moderation findings are at odds with Huangs' (2010) findings, where age as a moderator had no statistical significance. However, in very recent Cloud research, age has been significant. Nasi and Koivusilta (2013) found that as younger people are more active in using these technologies the effects of such usage differed from older adults.

It should be noted that 50 per cent of the *qualitative* sample represented the *quantitative* significant age group being discussed. This will be referred to later in this chapter.

2.1.5. Improved Psychological Well-Being

In the results summary above, a number of variables were found to improve psychological well-being. This is good news for employers, as the presence of psychological well-being has been found by previous research to lead to better economic results (Roberston & Cooper, 2011; Lyubomirsky et al., 2005). As net-centric systems improve well-being this technology should support mental and physical health and productivity (Diener & Seligman, 2004; Faragher, Cooper & Cartwright (2004); Harter et al. (2003) leading to greater economic results as a result of their deployment.

2.1 Qualitative Stream

This part of the present study utilised Smith's et al.(2009) IPA approach to explore the 5 interviews. This resulted in various themes being captured, and a measure of potency was used to decide on which to report. One overall finding was that people seemed to experience ambivalence, being both unaware of their perceptions, and having two opposing feelings simultaneously ("Oxford Dictionary", 1998). This conclusion is echoed by Nasi and Koivusilta (2013) where their study established that the majority of respondents did not necessarily perceive any change in their life from using the internet. The findings of the present study are summarised in Table 6.2.

Table 6.2 *Summary of IPA Theme Results*

Super Ordinate Theme	Sub-Theme	Overall Perception *
1. Impact of Magnitude of Information	Enabling and equalising	
	Feeling Overwhelmed / Overloaded	
	Distracting	
2. Pace of Work	Increased pace and expectations	
	Increased mistakes	
3. Frustrations that Limit Engagement	Difficulty finding data	
	Inability to use system	
4. High Dependency on Systems	Complete dependency	
	Credibility	
5. Collaboration	Hesitancy to contribute	
	Removal of previous barriers to communication	
	Membership and connectedness to Community	
6.Increases Confidence	Belief in information supporting objective achievement	
	Professional development and advantage (also as a result of Collaboration)	
	Confirms actions & acts as support for memory	
7.Excitement to Embrace	Amazement and wonder	

*Overall perception: **Green for a positive emotional experience**; **Red for a negative emotional experience**; **Orange for a neutral emotional experience**

It is evident that the overall experience of this phenomenon is emotionally mixed, or ambivalent. The researcher presents their interpretation of the sub-themes in the coloured 'Overall Perception' column of Table 6.2. It is interesting to note that the negative experiences of using net-centric technology is termed the 'Dark Side' (Bawden & Robinson, 2009; Leslie, 2011; Smith, Baxter, Boss & Hunton, 2012; Salanova et al., 2013; Tarafdar, Gupta & Turel, 2013) in recent research literature, and these effects seem to be coming under more investigation now that we have decades of computer technology experience. The super-ordinate themes will now be outlined and discussed.

2.1.2 The Magnitude of Information

It was evident that many people interviewed were very aware of the vastness, or magnitude, of the data available through net-centric systems. The first sub-theme of 'enabling and equalising' seems to be an aspect that has resonance with the idea of balancing organisational power, particularly in relation to the Cloud and e-mail systems. It is thought that the Cloud impacts organizational power structures through new patterns of communication, which are not sensitive to organizational hierarchies. These patterns are utilized to 'offset and counteract traditional power bases' (Wallace, 2004, p.285). As power shifts from goods and commodities to information, it means that those who have information, in an information-based society, have power (Gackenbach, 1998).

As mentioned in the literature review, Amichai-Hamburger et al. (2008) defined information as a key consideration enabling feelings of autonomy. This could support the findings of feeling 'enabled' by access to net-centric systems. A further aspect could be that net-centric system access satisfies people's 'informational needs' (Christensen & Griffiths, 2000), thus enabling and empowering them at the same time. Using such systems to satisfy informational needs are addressed in gratification theory (Kim & Weaver, 2002) where people are active participants motivated by their needs, or gratifications. Individuals may select net-centric media as they perceive it will indeed satisfy their needs.

Feeling overwhelmed and overloaded by information has seen much research focused on the Cloud. As discussed already, this is also termed Information Fatigue

Syndrome (“Reuters”, 2010) and Data Smog (Shenk, 1997). The present study supports previous research findings in that access to large quantities of information leads to the negative experience of being overwhelmed, or overloaded (“Reuters”, 2010; Rodman & Fry, 2011). This in turn could result in fatigue (Thomee, 2007) and anxiety (Wurman, 1980) leading to stress (Christensen & Griffiths, 2000).

McGrath’s (1976) conceptualisation of stress allows us to understand information overload as the situation of too much information to process that requires to be dealt with as part of the job task. A constant stream of information would be cognitively appraised, then perceived as too much to deal with by the individual. The individual then decides how to act by perhaps constantly processing the information, ultimately leading to fatigue.

Bawden and Robinson see information overload as an ‘information pathology’, associated with loss of control. Again Karasek’s (1979) model of stress related to job decision latitude is useful for understanding this aspect of the phenomenon.

A new aspect uncovered in the present study was that of the distracting nature of having access to lots of ‘linked’ information. The idea that availability of information is distracting has been questioned by Wallace (2004), and this research provides an answer, in that people do indeed find it distracting. As Goldhaber (1997) argued, people’s attention is the scarce resource, and the quality of people’s attention determines our effective activity (Gackenbach, 1998). This research has found that distraction is present, so, effective activity (Gackenbach, 1998), or productivity, can in turn be impacted by having access to these systems. This is at odds with one of

the main rationales of the creation of these systems, which is to *increase* productivity. One must bear in mind that reduced concentration due to distraction leads to less job satisfaction (Ragu-Nathan et al.,2008), and that reduced concentration could be the result of Technostress (Qiang, Kanliang & Qin, 2005). The Reuters Study (2010) found that 47 per cent of respondents felt distracted by information, and this reduced their ability to perform their management responsibilities. Distraction is related to concentration, and Nasi and Koivusilta (2013) found that in younger age groups concentration was perceived as reduced in relation to exposure to the Cloud. The present study also supports this conclusion.

2.1.3 Pace of Work

People spoke of their awareness of the increased pace of work from having net-centric system access, and the knock-on organisational increased performance expectations. Indeed, Bimber (1994) said that technology can affect expectations of society through making the various alternatives seem less or more favourable. Organisations drive for employee availability, and increased pace of work, through favouring net-centic systems that enable these behaviours. As technology increases the pace of work, so we find it shaping the expectations of organisations.

Perceptions of increased performance, and time pressures from using net-centric technologies, can have detrimental impacts on absenteeism through physical and mental health issues. These issues impact important organisational outcomes, such as a reduction in commitment and turnover (Kurland & Bailey, 1999; Levine & Norenzayan, 1999; Bellavia & Frone, 2005; Duxbury et al., 2008), and in turn economic results.

The increased pace, facilitated by net-centric systems, has been related to TechnoStress when considering the resultant pressures that computer technology creates (Johansson-Hide, Wastlund & Wallin, 2003). This leads to more stressed workers with all the related organisational impacts discussed, such as reduced commitment and productivity (Tarafdar et al., 2011; Ayyagari et al., 2011).

2.1.4 Frustrations Limiting Engagement

Various frustrations were uncovered by the present study that have impacts on both people at work and organisational performance. People felt they had difficulty using the systems. It would seem that 41 per cent of people are still hesitant to go on-line, as they find technology too overwhelming and frustrating ("Pew ", 2000). Indeed, the level of frustration when using computers can be great. Ceaparu, Lazar, Bessiere, Robinson and Shneiderman (2004) discovered that one-third of time spent by people on computers result in a state of frustration. If people cannot use the systems, and performance is dependent on the employee's ability to use the technology for their job (Lee & Kim, 2009), then performance will be impacted.

Peters and O'Connor (1988) categorised job related information as a primary situational constraint, which can lead to stress in the workplace. Many systems are deployed with a reliance on 'intuition' to be able to engage with them. In this specific case no training was provided so intuition was relied upon. As one of the findings of the present study was that people experienced an inability to use the system this could be related to lack of knowledge of how to use the system, and hence a situational constraint of job-information, potentially leading to stress.

Another finding was that employees could not find what they were looking for. This finding resonates with Reuters (2010) conclusions that people struggle to find the information required, with managers wasting considerable time in this activity. Perhaps ability to use and find information explains a component of the frustration that is often reported in computer technology research (O'Driscoll & O'Driscoll, 2010). Experiencing frustration has a negative impact on psychological health and well-being (O'Driscoll & O'Driscoll, 2010) and also on organisational performance.

If we consider the idea of attribution theory then we find the closely linked concept of learned helplessness. The outcomes of helplessness are emotional, motivational, and cognitive. Learned helplessness is associated with uncontrollable events and behaviours (Seligman, 1975). So, if working with net-centric technologies leads to continual frustration people may perceive themselves as lacking environmental control, resulting in the formation of learned helplessness. If control is lacking and demand is high there is the potential for stress according to Karasek's (1979) theory of stress.

2.1.5 High Dependency on Systems

From the analysis it was evident that there was a sense of high dependency on net-centric systems. New technology increases our dependency on machine-operated communication systems and networks (Weinberg & Cooper, 2007). The phenomenon of technological dependence is not new, and was described by McCunne (1999). However, the psychological construct of technology dependency was undefined until 2011 when it was measured by Shu et al. (2011).

Computer usage at work is categorised on a spectrum from people who make little use, to people who rely completely on computers to do their job. All interviewees experienced moderate to high dependence on net-centric usage across the occupations sampled. It was a potent finding that the concept of technology dependence was present across all occupations, not just high usage occupations. People who experience technological dependence often worried about how to do their job when their systems were not available, as was found to be the case in Cloud research (Seppala, 2001). With this in mind, it may be true that even occupations that do not rely heavily on their net-centric systems, still experience anxiety potentially leading to stress, as a result of anticipated actual unavailability.

2.1.6 Collaboration

The super-ordinate theme of collaboration is comprised of a number of sub-themes requiring discussion. By collaborating, people feel a sense of community. Net-centric systems create membership to virtual communities. Kraut et al. (2002) established that social involvement increased with access to the Cloud. Social involvement is an aspect of collaboration, and so access to net-centric systems in the present study supports increased feeling of collaboration. Feeling a sense of community draws parallels with the concept of decreased loneliness and increased social behaviour when using the Cloud (Morahan-Martin & Schumacher, 2003). Being part of a community reduces depression (Carpenter & Buday, 2007), so it is possible to rationalise that these factors would improve psychological well-being as was found by Morahan-Martin & Schumacher (2003) and Kraut et al. (2002).

A sense of collaboration is cited as an expectation from employee systems (Lamb, 2011) where employee's requirements include 24-by-7 access with proactive, real-time and on-line interaction with colleagues.

Hesitancy to contribute was also found, supporting the findings of the Pew Cloud & American Life Project (2003), which determined that almost half of people they surveyed were hesitant to engage the Cloud. This was due to feelings of being overwhelmed and frustrated. As the present study also found, feelings of being overwhelmed, and frustrated, this may be linked to their hesitancy to contribute.

2.1.7 Increased Confidence

An increase in confidence was a potent finding of the present study. Having access to net-centric systems was perceived as helping people achieve their job tasks. This supports the findings of Cooke & Kroeze's study (2004) that established that employees felt such systems facilitated their work; also the results of Madden & Jones (2008) that workers believed that such systems increased their ability to achieve goals.

Other studies found that being linked, through the Cloud, fosters a sense of support (Skitka & Sargis, 2005; Kraut, Kiesler, Boneva, Cummings, Helgeson & Crawford, 2002) that enhances personal identity (Bennett & Sani, 2004). This could explain the present study having found increased confidence through professional development as a result of access to these portals.

The feeling of professional development through learning, discovered in the present study, supports the findings by Howard et al. (2001). They concluded that access to the Cloud resulted in an increase in people's perception of their ability to work, as they were more able to develop through exposure to such knowledge. Beaudoin and Thorson (2004) categorised one of the ways people use net-centric information as elaboration. This is when new information is mixed with other information already stored in memory. Elaboration was found in the present study that aided professional development, through enhancing confidence, by having access to information and others.

People also reported that having access to this medium acts as a support for memory. This finding is echoed by Sparrow, Liu and Wegner (2011) where changes in memory structures were observed through people, by forgetting items they perceived as available on the Cloud, and remembering items they perceived as not being available on the Cloud. They concluded that people use the Cloud as an external hard drive type repository. This denotes an increase in their dependency on the medium (Sparrow et al., 2011). This research also found a perception of high dependency on net-centric systems, as does the present study. It is possible that these two concepts are related, as they are both reported as facets of the experience in the present study.

2.1.8 Excitement to Embrace

The researcher discovered an overwhelming excitement and appreciation, even a sense of wonder, at the possibilities of this technology. The excitement experienced

led to a sense of appreciating the positive influence upon their work lives. This is a new finding in net-centric research. This could be described as a positive attitude to usage, and that attitudes are a key determinate of intention to use a technology that if not present leads to a 77 per cent decrease in engagement with technology (Herbert & Benbast, 1994). Positive attitudes such as this super-ordinate theme, lead to less anxiety and exhaustion when using net-centric systems in a job role (Beas & Salanova, 2004).

Now that the findings of the two streams of the studies have been highlighted, and discussed, this chapter will proceed to explore the triangulation between the qualitative and quantitative studies.

2.2 Triangulation of Quantitative and Qualitative Findings

The present study comprised of two streams, qualitative and quantitative, which were run in parallel. Triangulating the findings from the two studies expands the validity of the research. The mixed method approach offers a rigorous framework by which researchers can not only analyse trends, pervasiveness and results, but also encompasses ‘meaning, context and process’ (Creswell & Plano Clark, 2007, p.175). This in essence allows us to understand the world on various levels. Gephart (1988) states a multiple layered view on reality makes us more certain that we have captured the fundamental nature of the subject under study. Even although these samples come from completely different areas, one being various roles within a single organisation, and the other various occupations from independent organisations, triangulation exists on the experience of net-centric systems.

Throughout the discussion that has been presented, the researcher has already drawn a few synergies that start to triangulate the results of the present study. The triangulation will now be expanded.

2.2.2 Overall Impressions - Ambivalence

An overarching finding from both studies was the sense of ambivalence experienced. This was found at a variable level in the quantitative stream, and an overall impression level in the qualitative stream. In the quantitative stream the components clustered into a variable simultaneously representing opposing feelings.

From the qualitative perspective, the researcher was struck by the lack of thought about how technology is experienced, as a reflection of the absence of depth of participant responses. The researcher had to work with the interviewee to realise their experience of the phenomenon. And, once analysis was complete the super-ordinate themes retained their overall sense of ambivalence, in that they presented opposing feelings.

Finding ambivalence across these studies and on different levels within the same study, leads the researcher to be more certain of the existence of ambivalence to net-centric technologies across multiple occupations and organisations.

It has been argued that the existence of ambivalence has been created by technology in postmodern societies (Goldman, 1989). If indeed ambivalence is ‘endemic and irresolvable’ (Mick & Fournier, 1998a, p. 125), it is argued that it needs to be accepted and coped with rather than resolved. What needs to be coped with,

as a result of experiencing ambivalence, is the stress and anxiety that it causes (Mick & Fournier, 1998b).

As the results of the present study are intended for practical use, the researcher has grouped the remaining synergies into those that are ‘Productive’ and those that are ‘Counter Productive’ in serving organisational’ goals

2.2.3 Productive

2.2.3.1 Excited, Appreciative and Embracing Feelings

Both sets of findings captured positive orientation to these technologies. In the quantitative stream a component was formed with items all tapping into an open, engaging, appreciative experience of net-centric technology. All these items show an active engagement with technology, and a viewpoint that such technology has indeed improved our work lives. This paralleled with the potent feelings of the qualitative study, being amazement and wonder, representing an excitement to embrace this technology in the workplace for all occupations interviewed. This was also supported in this stream with a sense of engagement leading to professional development, conveying how people sought out this experience from the technology.

2.2.3.2 Collaboration & Increased Confidence

Some triangulation exists between the quantitative technical portal orientation and the qualitative themes of collaboration and increased confidence. The technical portal captures items tapping into feelings of working more effectively and interacting with others. Likewise, so does a sense of collaboration through membership to a community and from a confidence standpoint there is a belief that the systems support achievement of work objectives. Feelings of collaboration and increased confidence through ability to work are found in both the qualitatively and

quantitatively results. As a main aim of setting up the portal reviewed in the quantitative study was sharing information, and so enabling collaboration, this study provides evidence that not only does this successfully occur within one company, but indeed across occupations in different companies.

2.2.4 Counter Productive

Ayyagari et al. (2011) said that some consequences of ICTs are counterproductive, and indeed, the present study supports this claim and will present them in this section.

2.2.4.1 Distraction

An exasperated experience of technology from the quantitative study resonates with the impact of information frustrations, limiting engagement, from the qualitative study. If we review the items that make up the scale for the exasperated experience, see Table 4.3, we see many items deal with interruption and distraction. This experience is replicated in the findings of the qualitative study, that many distractions were experienced when using net-centric systems. The qualitative study perhaps provides us more detail on the type of distraction experienced, where the most prevalent is following information hyperlinks. This is supported again specifically by the items in the quantitative components with one in particular being related to the 'mind wandering', as it does when information chains are followed in the qualitative stream. The items from the quantitative study also highlight distractions such as the noise of technology as an interruption. Both studies seem to tap into the same psychological construct and in putting the information together a fuller picture of resultant distractions is achieved.

2.2.4.2 Stress

A number of related, and perhaps confirmatory aspects, arise with regard to the stress related concepts of the experience. Salanova et al. (2013) found TechnoStrain was represented by feelings of anxiety. One of the findings of the qualitative study was that people felt overwhelmed by net-centric technologies. Feeling overwhelmed can be a form of anxiety, so could represent the existence of TechnoStrain. This has parallels with the quantitative study finding of an exasperated experience of technology. Both these findings could be indicative of TechnoStrain and in turn as Salanovas et al. (2013) found, TechnoStress due to the existence of TechnoStrain.

Transaction theory views of coping with stress, such as those of McGrath and Karasek that were overviewed, focused on the thoughts and actions that occur in response to ‘stressors’. As reactions to stress change over time, as efforts and outcomes are appraised (Cooper et al., 2001), it is key that organisational interventions consider individual employees appraisals and behaviours as a result of stressors activities rather than adopting a ‘blanket approach’ to dealing with stress (Cooper et al., 2001).

2.3 Implications

2.3.2 Contributions to Existing Knowledge

The present study has, in many cases, uncovered new knowledge about the experience of net-centric systems at work. This was expected as this area has

received very little, if any, research focus. Many contributions have been highlighted as the discussion has unfolded. Some highlights can now be summarised, being:

1. Ambivalence as a psychological construct
2. Negative ambivalence as a mediator between appreciative embracing technology and psychological well-being.
3. Job role is related to psychological well-being.
4. Enterprise technicians experience increased well-being related to an increase in negative ambivalence.
5. Enterprise technicians experienced increased well-being due to an increase in being exasperated
6. Enterprise technicians experience reduced well-being when using technically orientated systems.
7. Age is related to psychological well-being
8. Age has a moderating interaction with appreciative embracing orientations and negative ambivalent orientations.
9. Having a positive embracing attitude is mediated by negative ambivalence
10. Information distraction is experienced at work
11. There is a high dependency on net-centric systems across all jobs sampled
12. Such systems increase professional confidence
13. There exists a ‘wonder’ and ‘excitement’ around the usage and capabilities of such technologies

2.3.3 Implications for Practice

In essence, as net-centric technologies are pervasive, it is fortuitous for industry that in the main, the present study finds a lot of positive outcomes of their usage. Companies that are investing in net-centric portals for all employees can now do so with the confidence that their deployment increases their employee's health and well-being in most cases. Various implications of the findings, and items for consideration, will now be presented from the researcher's professional ICT experience and the recommendations of others.

2.3.3.1 Managing Frustration and Stress

The frustrations and stresses of net-centric usage need to be at the forefront of any manager's mind. Indeed, successfully addressing stress within an organisation requires executive level commitment (Brillhart, 2004). Existing Human Resources Stress policies and programs need to be expanded to address potential stressors, and strains, from using net-centric systems, covering awareness and coping strategies. Employees should be made aware of these potential stresses and how to cope with them. For example to take short breaks during the day (Brillhart, 2004), which may interrupt the feeling of exasperation and frustration.

A taxonomic approach (Cox, 1987) should be considered to addressing TechnoStress, broken down to problem focused and emotion focused interventions. Problem focused deals with the demands, and emotion focused with the resultant emotions (Cooper et al., 2001). Primary interventions occur at the organisational level and tackle stress by reducing sources of strain. Relevant to the present study findings, primary interventions include (Elkin & Rosch, 1990):

1. Changes to decision making with increased employee participation in net-centric requirements capturing and deployment approaches.
2. Creation of a most supportive climate, through perhaps training and support with technology usage by help-desk or mentor relationships.

A key component of the interventions listed above is a perception of greater individual control over their work environment (Cooper et al., 2001).

Secondary interventions involve the employee adjusting to the stress. This level of intervention is the most prevalent within organisations (Dewe, 1994) through employee assistance programs (EAPs) and wellness programs (Ganster, 1995). Such programs should be expanded to include the stress of working with net-centric systems.

Brillhart (2004) outlines a general six steps approach to reducing TechnoStress that may assist organisations, being:

1. Foster co-operation
2. Provide opportunities for hands on practice
3. Distribute the expertise
4. Simplify the technicalities
5. Lower the anxiety threshold
6. Set priorities.

2.3.3.2 System Dependence

The anxiety of net-centric systems dependence should be addressed at an organisational level. Some suggestions may be to support net-centric systems as part of existing ICT service level agreements, and help desk policies. If a systems outage is experienced, providing clear and regular communications as to the status of the outage is a standard ICT practice. In cases, where appropriate, other ways of working could act as a back-up, so work can continue. These processes should be communicated to employees and reflected in the employee's handbook to mitigate anxiety for this eventuality.

2.3.3.3 Distraction

The distraction of having too much information is a concern for organisations. In this case employees can be made aware of strategies to limit distraction, such as switching off informational alerts. A good organisational strategy would also be to send informational communications after hours when their impact is less disruptive and distracting. Some organisations have implemented a 'no-email' day to minimise distraction and encourage people to speak to each other.

In terms of information seeking behaviours, employers need to help employees stay focused on processing relevant information, rather than being again distracted by extraneous links. When populating repositories, requirements should take into consideration the complexity of information linkage, and maintenance thereof, to minimise distraction.

Bawden and Robinson (2008) suggest an approach to minimising distraction that they call 'satisficing'. This strategy involves limiting information collection to just

enough to fulfil the need, as opposed to being overwhelmed with too much information. In order to take this approach an employee will need to have awareness of when enough information is achieved, and also to have a viewpoint of ‘just enough is good enough’ (Bawden & Robinson, 2008, p. 185).

2.3.3.4 Deployment Strategies

Deployment strategies are important as they enable employees to control how they use systems to maximum effect. Control has been cited as an important consideration in the minimisation of stress (Spector, 1986). As mentioned, items like how to prioritise information, how to control distractions, and how to find what you are looking for, should be a key consideration for training when designing deployment. Lamb (2011) found people preferred a ‘self-service’ model providing them the ability to set, needs specific, alerts and notifications., allowing a tailored ‘push’ of information to employees (Sinickas, 2005).

It is also a recommendation that deployment strategies involve negotiation, also called participative decision making, in order to minimise the negative and stressful impact of technology deployment (Lowin, 1968). This involves the people who are affected by the decisions actually being consulted in the decision making process, before management makes major decisions (Wagner, 1994). In ICT ‘speak’ this would be the equivalent of user requirements gathering and involving users in the design and deployment of the net-centric system.

Deployment should consider creating guidelines of usage, as opposed to rules, so employee autonomy is supported (Bia & Kalika, 2007) and feelings of control are sustained.

All of the above considerations, as part of the deployment, could be formalised into a code of conduct, such as part of the employee handbook, for diffusion throughout the organisation (Bia & Kalika, 2007).

As the results indicate, special attention should be paid to the age group 46 to 55, as here a state of annoyance with technology aided their sense of well-being. So, they should not be forced to adopt such systems by management, but rather be allowed to find their own way to connect with this new system. As mentioned a set of guidelines could work well with this age group. With regard to the technical job role of enterprise technologists, perhaps structuring specific forums to meet their needs would help to counteract the negative impact of using net-centric systems and instead align a positive experience with good psychological well-being.

2.3.3.5 Setting of Pace of Work Expectations

Managers should be sensitive to the detrimental impact of increased pace of work, and the potential resultant increase in mistakes. People controlling tasks need to ensure that they verify with employees that expectations for completion are reasonable. In addition, support requirements should be understood and provided. Realistic expectations around employee's response time for tasks associated with net-centric systems should be defined, and communicated to the organisation such as e-mail response times. Managers and employees should not expect information to be processed immediately due to the fact it is available immediately.

2.4 Limitations

A number of inherent limitations of the present study will be noted.

2.4.2 Sample & Response Limitations

The quantitative study targeted all people within a single organisation by territory. However, achieving a good response rate was a challenge (26% responded). Upon reflection, a full test of the software used for survey would probably have increased this rate as the 'junk' folder error would have been addressed. Although the response rate was 26%, the possible effects of non-response bias and variability of response cannot be ignored. In some studies this has been overcome by direct administration of the instrument on-site (Greenberg & Mayer, 1964), but in this case this was not possible due to the involvement of varying geographic locations across EMEA. Language is another potential limitation, the instrument being English, and the participants speaking first languages varied as the sample was from all over Europe. This could have led to reduced understanding, impacting results. The participant's willingness to honestly and accurately disclose the required information should also be considered a limitation.

The quantitative research sample was not fully representative of different job roles or of gender. It would have been better to perhaps approach individuals to participate in the research to ensure more job roles more represented. However, coercions may have been indirectly present as the researcher is in senior management within the organisation. As part of the study was conducted on a single organisation, it would have been an improvement to involve numerous organisations as net-centric systems are fundamentally the same but their configuration varies.

Regarding the qualitative study using IPA, the sample size, in alignment with Smith et al. (2009), utilised a reduced number of participants. This allowed a more in-depth analysis that would be impeded by a larger sample size. Here the researcher sampled across occupations with the aim of increasing transferability of the present study. As all participants were male, this is a limitation of the research. However, transferability may be limited by the sample size in that all interviewees were male. Research would have been enhanced if females were included.

2.4.3 Capturing the Experience

Self-report questionnaires were utilised in the quantitative study. With particular reference to frequency of usage, rather than relying on a person's perception of usage, the researcher could have improved the present study by obtaining actual usage from the system statistics.

The qualitative study employed IPA, and a key point of this approach is that of rigour. Smith et al. (2009) suggests achieving this by using an audit. Audit can be done through using other researchers to check interpretations. In this case, the researcher did not work as part of a research team due to this being a thesis. Another facet of audit is triangulation within method, using items such as diaries (Casey & Murphy, 2009). The research could have been improved by using a form of auditing as outlined.

2.4.4 Re-Evaluating the Data

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As mentioned half the sample for the qualitative study involved the age group identified as of particular significance in the quantitative study. As the present study

was run in parallel this link was not established at the time of analysis. It would have been interesting to extract the themes from this age group in isolation to see if any triangulation was found.

2.4.5 Transferability and Generalizability

A single company was selected in an attempt to control extraneous factors that might impact the variables under quantitative investigation. The selection of a single organisation is not generally recommended, and has reduced the distributional effectiveness of the survey. As the survey had under the recommended number of observations per major subgroups (Borg & Gall, 1989) generalisation should be treated with caution. This could have been addressed if the research was delayed until the organisation had come to terms with the restructuring. Another factor was that one organisation with one net-centric system portal was investigated. It would have been useful to explore the experience of employees from other organisations with other net-centric systems. To this end, other organisations could have been approached to take part in the research to increase transferability.

In order to allow for broader contextualisation of the results, being generalization, a sample of diverse occupations was targeted in both the quantitative and qualitative studies. Additionally, transparency was addressed by providing interview quotation in order that the readers can evaluate transferability of the sample (Pringle, Drummond, McLafferty & Hendry, 2011).

2.5 Recommendations for Future Research

As this research explored a specific area that was to date unexplored, there are a multitude of recommendations for future research. Previous research focused mainly

on purely Cloud studies, and rarely specifically on the impact of net-centric systems in the workplace. At a general level, the researcher calls for more research into this phenomenon of the workplace. Some specific areas for future research will now be highlighted.

The findings of the present study are varying and multileveled. This is indicative that there is a need to expand this research area to further understand the impacts of this phenomenon. Attention should be paid to the age group and job roles in relation to psychological well-being when using net-centric systems.

The finding that a negative state of ambivalence, and an exasperated orientation to technology, increases a person's psychological well-being when using net-centric systems, is worthy of further exploration.

A hesitancy to contribute was a theme found in the super-ordinate theme of collaboration. This could be explained by investigating what are the contributing factors. Anxiety with using net-centric systems could be a factor, as much research has found a link here (Gardner et al. 1989, Seppala, 2001) related to computer systems.

When technical people use predominately technical portals it results in a reduction in their psychological well-being, meaning that using this portal is detrimental to their health. As many organisations are deploying these systems aimed particularly at technical people it should be investigated why this group are having this experience.

2.6 Conclusions

The experience and impacts of net-centric systems is an important arena for occupational psychologists to make valuable contributions to industry through the application of a professional empirical approach. The present study strove to explore the experience of net-centric system usage in the work environment. By using both qualitative and quantitative approaches to data collection, and analysis, rigour has been enhanced.

The findings of the present study hope to help managers, and employees, in dealing with net-centric systems, in the main, to improve. A major finding was that employees using net-centric systems have improved their psychological well-being at work. This finding is significant in that many organisations have replaced organisational contact and communication with these types of technologies, without really knowing if it helped, or hindered, their employees. Now, we can say that overall it improves the work experience. People are excited to embrace this new and pervasive technology. They perceive it as enabling collaboration, increasing their work confidence, and distributing power through equal access to information.

Some studies found deleterious impacts on psychological well-being. The present study found that for certain technical people, access to a technical portal actually reduced their well-being at work. Also, certain negative orientations to technology were shown to promote well-being, particularly prevalent in certain age categories. People also experienced a feeling of being frustrated, overwhelmed and distracted by these systems. In some cases they did not feel able to find what they were looking for.

This research has resulted in some interesting and unexpected findings that require further investigation within different organisations. Unfortunately, policy for shaping the adoption of technologies has not been shaped by psychological research findings and their implications, but rather driven by economic and technological imperatives (O'Driscoll & O'Driscoll, 2010). It is the hope of the researcher that this will change, as economic results are directly related to the usage of such systems.

Studies need to be conducted into the social and psychological impact of these systems, so that we continue to expand and develop our knowledge of this pervasive technological phenomenon.

REFERENCES

Aiman-Smith, L., & Green, S. G. (2002). Implementing new manufacturing technology: The related effect of technology characteristics and learning activities. *Academy of Management Journal, 45*, 421-430.

Ajzen, I. (2001). Nature and operation of attitudes. *Annual Review of Psychology,* 52, 27-58.

Ajzen, I. & Fishbein, M. (1980) *Understanding Attitudes and Predicting Social Behaviour*. Englewood Cliffs, New York: Prentice Hall.

Al-Khaldi, M. A., & Al-Jabri, I. M. (1998). The relationship of attitudes to computer utilization: New evidence from a developing nation. *Computers in Human Behavior, 14*(1), 23-42.

Amichai-Hamburger, Y. (2008). The effects of Need for Cognition on Internet use revisited. *Computers in Human Behavior, 24*(2), 361-371.

Amichai-Hamburger, Y., & Ben-Artzi, E. (2003). Loneliness and Internet use. *Computers in Human Behavior, 19*(1), 71-80.

Anderson, A. A. (1996). Predictors of computer anxiety and performance in information systems. *Computers in Human Behavior, 12*(1), 61-77.

Armitage, C. J., & Conner, M. (2001). Efficacy of the theory of planned behaviour: A meta-analytic review. *British Journal of Social Psychology, 39*, 469-493.

Arnetz, B. B. (1997). Technological stress: Psycho-physiological aspects of working with modern information technology. *Scandinavian Journal of Work Environment and Health, 23*(S3), 97-103.

Arnetz, B. B., & Wikholm, C. (1997). Technological Stress: Psychophysiological

symptoms in modern offices. *Journal of Psychosomatic Research, 43*(1), 35-42.

Arnold, J., Cooper, C.L., & Robertson, I.T. (1998) *Work Psychology: Understanding Human Behaviour in the Workplace.* Gosport: Financial Times Prentice Hall.

Arnold, J., Sylvester, J., Petterson, F., Robertson, I., Cooper, C. L., & Burnes, B. (1998). *Work Psychology* (3rd ed.). Harlow: Pearson Education Limited.

Aronsson, G., Dallner, M., & Abrorg, C. (1994). Winners and losers from computerization: A study of the psychosocial work conditions and health of Swedish state employees. *International Journal of Human -Computer Interaction, 6*, 17-36.

Averill, J. E. (1973). Personal control over aversive stimuli and its relationship to stress. *Psychological Bulletin, 80*, 286-303.

Avey, J. B., Luthans, F., Smith, R. M., & Palmer, N. F. (2010). Impact of positive psychological capital on employee well-being over time. . *Journal of Occupational Health, 15*, 17-28.

Ayyagari, R., Grover, V., & Purvis, R. (2011). TechnoStress: Technological antecedents and implications. *MIS Quarterly, 35*(4), 831-858.

Baack, S. A., & Brown, T. S. (1991). Attitudes towards computers: Views of older adults compared with young adults. *Journal of Research on Computing in Education, 23*(3), 422-454.

Bailey, J. E., & Peasron, S. W. (1983). Developing a tool for measuring and analysing computer user satisfaction. *Management Science, 29*(5), 530- 545.

Baily, M. N. (2004). Recent Productivity Growth: The Role of Information Technology and Other Innovations*. FRBSF Economics Review 2004,* 35-42.

Bakos, Y. (1998). The emerging role of electronic marketplaces on the internet. *Communications of the ACM, 41*(8), 35-42.

Bargas-Avila, J. A., Lötscher, J., Orsini, S., & Opwis, K. (2009). Intranet satisfaction questionnaire: Development and validation of a questionnaire to measure user satisfaction with the intranet. *Computers in Human Behavior, 25*(6), 1241-1250.

Bartlett, M. S. (1954). A note on the multiplying factors of various chi square approximations. *Journal of Royal Statistical Society, 16*(B), 296-298.

Bawden, D., & Robinson, L. (2008). The dark side of information: Overload, anxiety and other paradoxes and pathologies. *Journal of Information Science, 35*(2), 180-191.

Bawden, D., & Robinson, L. (2009). The dark side of information: Overload, anxiety and other paradoxes and pathologies. *Journal of Information Science, 35*(2), 180-191.

Bazeley, P. (2002). Computerized data analysis for mixed methods research. in A. Tashakorri, & C.Teddlie (Eds.), *Handbook of Mixed Methods for the Social and Behavioral Sciences. Thousand Oaks, CA: Sage, 385-422.*

BBC. (2003). *Keep Cool Over Computer Hassles*. Retrieved from http://news.bbc.co.uk/1/hi/technology/3204719.stm

Beas, M. I., & Salanova, M. (2004). Self-efficacy beliefs, computer training and psychological well-being among information and communication technology workers. *Computers in Human Behavior, 22*, 1043-1058.

Beaudoin, C. E., & Thorson, E. (2004). Testing the cognitive mediation model: The roles of news reliance and three gratifications sought. *Communication Research, 32*(2), 157-177.

Beckers, J. J., & Schmidt, H. G. (2001). The structure of computer anxiety: a six factor model. *Computers in Human Behavior, 22*, 1043-1058.

Beckers, J. J., & Schmidt, H. G. (2003). Computer experience and computer anxiety. *Computers in Human Behavior, 19*(6), 785-797.

Beehr, T. A., & Bhagat, R. S. (Eds.). (1985). *Introduction to Human Stress and Cognitions in Organisations*. New York: Wiley.

Bellavia, G. M., & Frone, M. R. (Eds.). (2005). *Work-family Conflict*. Thousand Oaks, CA: Sage.

Bennett, M., & Sani, F. (Eds.). (2004). *The Development of the Social Self*. Hove: Psychology Press.

Bessiere, K., Newhagen, J. E., Robinson, J. P., & Schniederman, B. (2006). A model for computer frustration: The role of instrumental and dispositional factors on incident, session, and post-session frustration and mood. *Computers in Human Behavior, 22*(941-961).

Bessiere, K., & Schmidt, H. G. (2001). The structure of computer anxiety: a six-factor model. *Computers in Human Behavior, 17*, 35-49.

Bia, M., & Kalika, M. (2007). Adopting an ICT code of conduct: An empirical study of organizational factors. *Journal of Enterprise Information Management, 20*(4), 432-446.

Bimber, B. (Ed.). (1994). *Three faces of technological determinism. Does technology drive history?* Cambridge, MA: MIT Press.

Blaikie, N. (2000). *Designing Social Research*. Oxford: Blackwell.

Boneva, B., & Kraut, R. (2002). Email, gender, and personal relationships. In Wellman, B. & C. Haythornthwaite.(Eds.) *The internet in everyday life* (pp. 370- 403). Oxford: Blackwell Publishing.

Borg, W. R., & Gall, M. D. (1989). *Educational Research*. White Plains, NY: Longman.

Bowerman, B. L., & O'Conner, R. T. (1990). *Linear statistical models: An Applied Approach (2nd Ed.)* Belmont, CA: Duxbury.

Brace, N., Kemp, R., & Snelgar, R. (2000). *SPSS for Psychologists: A Guide to Data Analysis using SPSS for Windows*. London: Palgrave.

Brannen, J. (2005). Mixing methods: The entry of qualitative and quantitative approaches into the research process. *The International Journal of Social Research Methodology, Special Issue, 8*(3), 173-185.

Brannen, J. (2012). Mixed Methods Research: *A Discussion Paper*. Retrieved from http:// eprints.ncrm.ac.uk/89/1/MethodsReviewPaperNCRM-005.pdf

Brannen, J., & Collard, J. (1984). *Marriages in Trouble: The Process of Seeking Help.* London: Unwin Hyman.

Bernstein, R.J. (1983). Beyond Objectivism and Relativism. Philadelphia: University of Pennsylvania Press.

Breakwell, G. M., Hammond, S., & Fife-Schaw, C. F. (1995). *Research Methods in Psychology*. Thousand Oaks: Sage.

Breckler, S.J. (1984). Empirical validation of affect, behaviour and cognition as distinct attitude components'. *Journal of Personality and Social Psychology*, 47, 1191-1205.

Breese-Vitelli, J. (2012). *A comparative analysis of the use of competitive*

intelligence tools in a multinational corporation. (Doctoral dissertation, Robert Morris *University, Chicago).* Retrieved from ProQuest Dissertations and Theses (2011)

Brewer, J. (Ed.). (2004). *Ethnography*. London: Sage.

Brillhart, P. E. (2004). Technostress in the workplace: Managing stress in the electronic workplace. *Journal of American Academy of Business, September*, 302-307.

Brod, C. (1984). *Technostress: The Human Cost of The computer Revolution.* Reading, Mass: Addison-Wesley.

Brooke, J., & Boal, I. (1995). *Resisting the virtual life: The culture of politics and information*. San Francisco: City Lights.

Brunel University London. (2013) Qualitative Research Methods. Retrieved from http://bura.brunel.ac.uk/bitstream/2438/4580/1/Fulltext.pdf

Bryman, A. (1984). The debate about quantitative and qualitative research: a question of method or epistemology. *The British Journal of Sociology, 35*(1), 76-92.

Bryman, A. (1988). Quantity and Quality in Social Research. London & NY: Routledge.

Bryman, A. (2001). *Social Research Methods*. Oxford: Oxford University Press.

Brynjolfsson, E., & Hitt, L. M. (2000). 'Beyond computation: Information technology, organizational transformation and business performance. *The Journal of Economic Perspectives, 14*(4), 23-48.

Buchanan-Oliver, M. (2001). Discourses of technology consumption: Ambivalence, fear, and luminality. *Advances in Consumer Research, 39*, 287-291.

Campbell, J. P. (Ed.). (1990). *Modelling the performance prediction problem in industrial and organizational psychology*. Palo Alto, CA: Consulting Psychologists Press.

Caracelli, V. J., & Greene, J. C. (1997). Crafting mixed-method evaluation designs. In J. C. Greene, &V. J. Caracelli (Eds), *Advances in mixed-method evaluation: The challenges and benefits of integrating diverse paradigms.* San Francisco: Jossey-Bass.

Carpenter, B. D., & Buday, S. (2007). Computer use among older adults in a naturally occurring retirement community. *Computers in Human Behavior, 23*(6), 3012-3024.

Casey, D., & Murphy, K. (2009). Issues in using methodological triangulation in research. *Nurse Researcher, 16*(4), 40-55.

Cattel, R. B. (1996). The scree test for the number of factors. *Multivariate Behavioural Research 2*, 245-276

Cazares, A. (2010). Proficiency and attitudes towards information technologies' use in psychology undergraduates. *Computers in Human Behavior, 26*(5), 1004-1008.

Ceaparu, J., Lazar, J., Bessiere, K., Robinson, J., & Shneiderman, B. (2004). Determining causes and severity of end user frustration. *International Journal of Human -Computer Interaction, 17*(3), 333-356.

Chen, Y., & Persson, A. (2002). Internet usage among young and older adults: Relation to psychological well-being. *Educational Gerontology, 28*, 731-744.

Cherryholmes, C.H. (1992). Notes on pragmatism and scientific realism. *Educational Researcher*, 14, 13-17.

Chesley, N. (2010). Technology use and employee assessments of work effectiveness, workload, and pace of life. *Information, Communication & Society, 13*(4), 485-514.

Christensen, H., & Griffiths, K. (2000). The Internet and mental health literacy. *Australian and New Zealand Journal of Psychiatry, 34*(6), 975-979.

Churchill, G. A. (1979). A paradigm for developing better measures of marketing constructs. *Journal of Marketing Research, 16*(1), 64-73.

Clegg, S. R., & Palmer, G. (1996). *The Politics of Management Knowledge*. Thousand Oaks, CA: Sage.

Cooke, P., & Kroeze, J. H. (2004). *The impact of the internet on organisational culture within the IT industry*. Paper presented at the SAICSIT, South Africa.

Coolican, H. (1999). *Research Methods and Statistics in Psychology*. London: Hodder & Stoughton.

Cooper, C., L., Dewe, P. J., & O'Driscoll, M. P. (2001). *Organizational stress: A review and critique of theory, research, and applications*. Thousand Oaks, CA: Sage.

Cooper, C. L., Liukkonen, P., & Cartwright, S. (1996). *Stress prevention in the workplace: Assessing the cost and benefits to organisations*. Luxembourg: Office for Official Publications of the European Communities.

Coovert, M. D., & Burke, J. L. (2005). *Leadership and Decision-Making.* Oxford: UK: Oxford University Press.

Coovert, M. D., Thompson, L. F., & Craiger, J. P. (2005). *Technology*. Thousand Oaks, CA: Sage.

Cox, T. (1987). Stress, coping and problem solving. *Work & Stress, 1*, 5-14.

Crespin, T. R., & Austin, J. T. (2002). Computer technology applications in industrial and organisation psychology. *Cyberpsychology & Behavior, 5*(4), 279-302.

Cresswell, J. W. (2003). *Research Design: Qualitative, Quantitative and Mixed Method Approaches*. Thousand Oaks, CA: Sage.

Creswell, J. W., & Plano Clark, V. L. P. (2007). *Designing and Conducting Mixed Methods Research.* London: Sage.

Da Vaus, D. (2001). *Research Design in Social Research*. London: Sage.

Davenport, T. H., & Beck, J. C. (2001). *The attention economy: Understanding the new currency of business*. Cambridge, MA: Harvard Business School Press.

Davis, D., Bagozzi, R. P., & Warsaw, P. R. (1989). User acceptance of technology: a comparison of two theoretical models. *Management Science, 35*(8), 983-1003.

Delete Kraut, R., Kiesler, S., & Boneva, B. (2002). Internet Revisited. *Journal of Social Issues, 58*, 49-74.

Dewe, P. J. (1994). EAPs and stress management: From theory to practice to comprehensiveness. *Personnel Review, 23*, 21-32.

DeYoung, C. G., & Spence, I. (2004). Profiling information technology users: En route to dynamic personalization. . *Computers in Human Behavior, 20*(1), 55-65.

Dickinson, A., & Gregor, P. (2006). Computer use has no demonstrated impact on the well-being of older adults. *International Journal of Human -Computer Studies, 64*, 744-763.

Diener, E., & Seligman, M. E. P. (2004). Beyond money: Towards an economy of

well-being. *Psychological Science in the Public Interest 5*, 1-31.

Donald, I., Taylor, P., Johnson, S., Cartwright, S., & Robertson, S. (2005). Work environments, stress, and productivity: An examination using ASSET. *International Journal of Stress Management, 12*(4), 409-423.

Dorman, C., & Kaiser, D. (2002). Job conditions and customers satisfaction. *European Journal of Work and Organisational Psychology, 11*, 257-283.

Dos Santos, B., & Sussman, L. (2000). Improving the return on IT investment: The productivity paradox. *International Journal of Information Management, 20*(6), 429 - 431.

Drummond, J. (2007). Phenomenology: Neither auto- nor hetro- be *Phenomenology and Cognitive Sciences, 6*, 57-74.

Durndell, A., & Haag, Z. (2002). Computer self-efficacy, computer anxiety, attitudes towards the internet and reported experience with the internet, by gender in an East European sample. *Computers in Human Behaviour, 18,* 521-535.

Dutton, W., & Blank, G. (2011). Next generation users: *The internet in Britain*. Retrieved from http://www.oii.ox.ac.uk/news/?id=598

Duxbury, L., Lyons, S., & Higgins, C. (2008). *Too Much To Do and Not Enough Time: An Examination of Role Overload*. Amsterdam: Elsevier.

Dzurec, L.C., & Abraham. I.L.(1993). The nature of inquiry: Linking quantitative and qualitative research. *Advances in Nursing Science*, 16, 73-79.

Eatough, V., & Smith, J. A. (2008). Interpretative phenomenological analysis. In Willing C & W. Stainton-Rogers (Eds.), *The Sage handbook of qualitative research in psychology* (pp. 179-194). Los Angeles: Sage.

The Economist, (2010). Data,data everywhere. Retrieved from http://www.economist.com/node/15557443

Elkin, A., & Rosch, P. (1990). Promoting mental health at the workplace: The prevention side of stress management. *Occupational Medicine: State of the Art Review, 5*, 739-754.

EMC2. (2013). Digital Universe. Retrieved from http://uk.emc.com/leadership/programs/digital-universe.htm

Faragher, E. B., Cooper, C. L., & Cartwright, S. (2004). A shortened stress evaluation tool (ASSET). *Stress and Health, 20*, 189-201.

Fazio, R., & Petty, R. (2008). *Attitudes: Their Structure, Function and Consequence*. New York: Psychological Press.

Feehery, G. R. (1993). *The Role of Empathy in Sales Agent Performance and Customer Satisfaction in a Residential Real Estate Setting*. Florida: Nova University.

Fernald, J. G., & Ramnath, S. (2004). The acceleration in US total factor productivity after 1995: The role of information technology. *Economic Perspectives, 1*(February), 52-67.

Field, A. (2013). *Discovering Statistics Using IBM SPSS Statistics*. London: Sage.

Friedman, L. (2005). Measuring Reliability: The Intraclass Correlation Coefficient. Retrieved from http://ww.medcalc.org/manual/intraclasscorrelation.php

Fry, K. G. (2006). *Advertising and the body to advertising on the body: A socio-historical look at marketing of the future.* Paper presented at the XIV Economic History Congress.

Gackenbach, J. (1998). *Psychology and the Internet: Intrapersonal, Interpersonal, and Transpersonal Implications*. San Diego, CA: Academic Press.

Ganster, D. (Ed.). (1995). *Interventions for Building Healthy Organisations: Suggestions from the Stress Research Literature* Washington, DC: American Psychological Association.

Gardner, E., Young, P., & Ruth, S. (1989). Survivor sense making and reactions to organisational decline: The Effects of individual difference. *Management Communication Quarterly, 2*, 305-329.

Gephart, R. P. (1988). *Ethnostatistics: Qualitative foundations for quantitative research* Newbury Park, CA: Sage.

Goldhaber, M. H. (1997). *The attention economy and the net*. Paper presented at the Economics of Digital Information. Cambridge, MA. Retrieved from http://www.well.com/user/mgoldh/AtEcandNet.html

Goldman, S. L. (1989). Images of technology in popular films: Discussion and Filmography. *Science, Technology, and Human Values, 14*(3), 275-301.

Greenberg, H., & Mayer, D. (1964). A new approach to the scientific selection of salespeople. *Journal of Psychology, 57*(2), 113-123.

Greene J C (2008) Is Mixed Methods Social Inquiry a Distinctive Methodology? *Journal of Mixed Methods Research* 7, 2, 7-22.

Greene, J. C., & Caracelli, V. J. (1997a). *Advances in Mixed Method Evaluation: The Challenges and Benefits of Integrating Diverse Paradigms (New Directions for Evaluation, No. 74)*. San Francisco: Jossey-Bass.

Greene, J. C., & Caracelli, V. J. (1997b). *Defining and Describing the Paradigm Issue on Mixed-Method Evaluation*. In J.C. Greene & V.J. Caracelli (Eds.). *Advances in mixed method evaluation: The challenges and benefits or integrating diverse paradigms* (New Directions for Evaluation, No. 74, pp. 5-17). San Francisco: Jossey-Bass.

Gustafsson, E., Dellve, L., Edlund, M., & Hagberg, M. (2003). Experience and attitudes related to the use of information technology among young adults. *Applied Ergonomics, 34*, 565-570.

Halfpenny P (1997) *The Relation Between Quantitative and Qualitative Social Research.* Bulletin de Methodologie Sociologique, 57, 49-64.

Halfpenny, P. (2005). *The reflection between quantitative and qualitative research, paper presented at Mixed Methods Workshop*. Paper presented at the ESRC, Research Methods Programme. Manchester, UK.

Hamilton, M. B. (2009). Online Survey Response Rates and Times Background and Guidance for Industry. Retrieved from http://www.supersurvey.com/papers/supersurvey_white_paper_response_rates.pdf

Hammersley, M. (2000). Varieties of social research: A topology *The International Journal of Social research Methodology: Theory and Practice, 3*(3), 221-231.

Hammersley, M. (2005). Troubles with triangulation. Paper presented at Mixed Methods Workshop, ESRC, *Research Methods Programme*, Manchester, October.

Harter, J. K., Schmidt, F. L., & Keyes, C. L. M. (2003). Well-being in the workplace and its relationship to business outcomes: A review of the Gallup studies. In C. L. M. Keyes & J. Haidt (Eds.), *Flourishing: The positive person and the good life (pp.205-224)* Washington, D.C.: American Psychological Society.

Harter, J. K., Schmidt, F. L., Kilham, E. A., & Agrawal, S. (2009). *Q12 Meta Analysis: The Relationship Between Engagement at Work and Organisational Outcomes.* USA: Gallup Inc.

Hayes. (2013). *Introduction to Mediation, Moderation and Conditional Process Analysis*. New York, NY: Guilford.

Hebert, M., & Benbasat, I. (1994). Adopting information technology in hospitals: The relationship between attitudes/expectations and behavior. *Hospital and Health Services Administration, 39*(3), 369-383.

Hoffman, D., Novak, T., & Chatterjee, P. (1995). Commercial scenarios of the web: *Opportunities and challenges*. Retrieved from http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.109.7778&rep=rep1&type=pdf

Howard, E. N., Rainie, L., & Jones, S. (2001). Days and nights on the internet: The impact of a diffusion technology. *American Behavioral Scientist, 45*, 1-31.

Howe, K. R., & Eisenhardt, M. (1990). Standards for qualitative (and quantitative) research: A prolegomenon. *Educational Researcher*, 19(4), 2-9.

Howell, D. C. (1995). *Fundamental Statistics for the Behavioural Sciences (3rd Edn.)* Belmont, CA: Duxbury Press.

Huang, C. (2010). Internet use and psychological well-being: A meta-analysis. *Cyberpsychology, Behavior, and Social Networking, 13*(3), 241-249.

Huang, J.-H., Yang, C., Jin, B.-H., & Chiu, H. (2004). Measuring satisfaction with business-to-employee systems. *Computers in Human Behavior, 20*, 17-35.

Igbaria, M. (1993). User acceptance of microcomputer technology: An empirical test. *OMEGA International Journal of Management Science, 21*(1), 73-90.

Internet World Stats (2008). Internet World Stats*: Usage and population statistics* Retrieved from http://www.internetworldstats.com/stats4.htm

Jex, S. M. (1998). *Stress and Job Performance*. Thousand Oaks: Sage.

Jick, T. D. (1979). Mixing qualitative and quantitative methods: Triangulation in action.
Administrative Science Quarterly, 24, 602-611.

Johansson-Hiden, B., Wastlund, E., & Wallin, S. (2003). *Reflecting on ICT and stress: Conceptual connections and a suggested application (No, 2003:26)*. Karlstad: Karlstad University Studies.

Johnson, J. L. (Ed.). (1997). *Generalizability in qualitative research: Excavating the discourse*. Thousand Oaks: Sage.

Johnson, R. B., & Onwuegbuzie, A. J. (2004). Mixed methods research: A research paradigm whose time has come. *Educational Researcher 33*(7), 14-26.

Joinson, A. N. (2003). *Understanding the Psychology of Internet Behaviour: Virtual Worlds, Real Lives*. Bristol: Palgrave Macmillan.

Kahn, R. L., & Boyosiere, S. (Eds.). (1992). *Stress in organizations*. Chicago: Rand-McNally.

Kaiser, H. F. (1960). The application of electronic computer analysis to factor analysis. *Educational and Psychological Measurement, 20*, 141-151.

Kaiser, T. M. (2000). *Methode zur Konzeption von Intranets*. Kaiser, T. M. (Methode zur Konzeption von Intranets. Difo-Druck OHG, Bamberg).

Karasek, R. A. (1979). Job demands, job decision latitude, and mental strain: Implications for job redesign. *Administrative Science Quarterly, 24*, 285-308.

Kelle, U. (2001) Sociological explanations between micro and macro and the integration of qualitative and quantitative methods, FQS (Forum: Qualitative Research), 2, 1: Retrieved from http://www.qualitative-research.net/fqs-eng.htm

Kelley-Milburn, D., & Milburn, M. A. (1995). Csyberpsychology - resources for psychologists on the internet. *Psychological Science, 6*, 203-211.

Kim, S. T., & Weaver, D. (2002). Communications research about the internet: A thematic meta-analysis. *New Media & Society 4*(4), 518-539.

King, N. (2004). *Using Interviews in Qualitative Research*. London: Sage.

Kinman, G., & Jones, F. (2005). Lay representations of workplace stress. *Work & Stress, 19*(2), 101-120.

Kline, P. (1999). *The Handbook of Psychological Testing*. London: Routledge.

Knorr, E., & Gruman, G. (2011). What cloud computing really means. *InfoWorld*. Retrieved from http://www.infoworld.com/d/cloud-computing/what-cloud-computing-really-means-031?page=0,0

Koopman-Boyden, P. G., & Reid, S. L. (2009). Internet/e-mail usage and well-being among 65-84 year olds in New Zealand: Policy Implications. *Educational Gerontology 35*, 990-1007.

Korunka, C., & Vitouch, O. (1999). Effects of the Implementation of Information technology on employees' strain and job satisfaction: A context-dependent approach. *Work & Stress, 34*(4), 341-363.

Kozlowski, S. W. J., & Klein, K. J. (Eds.). (2000). *A Multilevel Approach to Theory and Research in Organisation: Contextual, Temporal and Emergent Process*. San Francisco, CA Jossey-Bass.

Kraut, R., Keisler, S., Boeva, B., Cummings, J., Helgeson, V., & Crawford, A. (2002). Internet paradox revisited. *Journal of Social Issues, 58*(1), 49-74.

Kraut, R., Patterson, M., Lundmark, V., Kiesler, S., Mukophadhyay, T., & Scherlis, W. (1998). Internet paradox: A social technology that reduces social

involvement and psychological well-being? *American Psychologist, 53*(9), 1017-1031.

Kraut, R. E., Scherlis, W., T., M., Manning, J., & Kiesler, S. (1996). The HomeNet field trial of residential internet services. *Communications of the ACM, 35*, 55-63.

Kudyba, S., & Diwan, R. (2002). The impact of information technology on U.S. industry. *Japan and the World Economy, 14*(3), 321-333.

Kuhn, T. S. (1963). The essential tension: tradition and innovation in scientific research. In C. W.Taylor, & F. Barron (Eds), *Scientific creativity: Its recognition and development* (pp. 341-154). N.Y: Wiley.

Kurland, N. B., & Bailey, D. E. (1999). Telework:Tthe advantages and challenges of working here, there, anywhere and anytime. *Organizational Dynamics, 28*, 53-68.

Lamb, J. (2011). Interactive employees communication: It's what employees want and you should know how to bring it to them. *Employee Benefit Adviser, January*, 34-35.

Langdridge, D. (2007). *Phenomenological Psychology: Theory, Research and Method*. Harlow: Pearson Prentice Hall.

Larkin, M., Watts S, & E, C. (2006). Giving voice and making sense in interpretative phenomenological analysis. *Qualitative Research in Psychology, 3*, 102-120.

LaRose, R., Eastin, M., & Gregg, J. (2001). Reformulating the internet paradox: Social cognitive explanations of internet use and depression. *Journal of Online Behavior, 1*(2). Retrieved from http://www.behavior.net/JOB/v1n1/paradox.html

Laura, R. A., & Chapman, A. (2009). The technologization of education:

Philosophical reflections on being too plugged in. *International Journal of Children's Spirituality, 14*(3), 289-298.

Lazarus, R. S. (1966). *Psychological Stress and the Coping Process.* New York: McGraw-Hill.

Lee, S., & Kim, B. G. (2009). Factors affecting the usage of internet: A confirmatory study. *Computers in Human Behavior, 25*, 191-201.

Leiter, M. P., Harvie, P., & Frizell, C. (1998). The correspondence of patient satisfaction and nurse burnout. *Social Science and Medicine 47*, 1611-1617.

Leslie, C. (2011). The master switch: The rise and fall of information empires; In the plex: How Google thinks, works, and shapes our lives; The net delusion: The dark side of internet freedom. *Journal of the American Society for Information Science & Technology, 62*(12), 2540-2543.

Levine, R., & Norenzayan, A. (1999). The pace of life in 31 countries. *Journal of Cross-Cultural Psychology, 30*(2), 178-205.

Li, H., Kuo, C., & Russell, M. (1999). The impact of perceived channel utilities, shopping orientations, and demographics on the consumer's online buying behaviour. Retrieved from http://onlinelibrary.wiley.com/doi/10.1111/j.1083-6101.1999.tb00336.x/full

Liaw, S.-S. (2002). An internet survey for perceptions of computers and the world wide web: Relationship, prediction, and difference. *Computers in Human Behavior, 18*(1), 17-35.

Lincoln, Y. S., & Guba, G. E. (1985). *Naturalistic Enquiry*. Beverley Hills: CA: Sage.

Loffland, J., & L.H., L. (1995). *Analysing Social Settings*. Belmont CA: Wadsworth Publishing Company.

Lowin, A. (1968). Participative decision making: A model, literature critique, and prescriptions for research. *Organizational Behavior and Human Performance, 3*, 68-106.

Lyubomirsky, S., King, L., & Diener, E. (2005). The benefits of frequent positive affect: Does happiness lead to success? *Psychological Bulletin, 131*(6), 803-855.

Madden, M., & Jones, S. (2008).Networked workers, *Pew Research Centre.* Retrieved from http://www.pewinternet.org

Mark, M. M., Feller, I., & Button, S. B. (1997). Integrating qualitative methods in a predominantly quantitative evaluation: A case study and some reflections. In J. C. Greene, & V. J. Caracelli (Eds), *Advances in mixed-method evaluation: The challenges and benefits of integrating diverse paradigms* (pp. 47-60). San Francisco: Jossey-Bass.

Mathison, S. (1988). Why triangulate? *Educational Researcher, 17*(2), 13-17.

Mason, J. (2002). *Qualitative Researching* (2nd ed.). London: Sage.

Mason J (2006) *Six strategies for mixing methods and linking data in social science research.* Real Life Methods National Centre for Research Methods. Manchester, UK.

Massey, W. F. (Ed.). (1962). *Statistical Analysis of Relations between Variables*. Belmont, CA: Wadsworth Publishing.

McCunne, J. C. (1999). Technology dependence. *Management Review, 88*(1), 10-13.

McGrath, J. E. (Ed.). (1976). *Stress and Behavior in Organisations*. Chicago: Rand McNally.

Meszaros, P. S. (2004). The wired family: Living digitally in the post-information age'. *American Behavioral Scientist, 48*(4), 377-390.

Mick, D. G., & Fournier, S. (1998a). Paradoxes of technology: Consumer cognizence, emotions, and coping strategies. *Journal of Consumer Research, 25*(September), 123-143.

Mick, D. G., & Fournier, S. (1998b). *Technological consumer products in everyday life: Ownership, meaning, and self-gifts: Implications for retail management* Cambridge, MA. 02138: Marketing Science Institute

Miles, M. B., & Huberman, A. M. (1994). *Qualitative Data Analysis: An Expanded Sourcebook*. Thousand Oaks, CA: Sage.

Millar, M.G. & Tesser, A. (1989). The effects of affective-cognative consistency and thought on attitude-behaviour relations. *Journal of Experimental Social Psychology,* 25, 189-202.

Moliner, c., Martinez-Tur, V., Ramos, J., Peiro, J. M., & Coropanzano, R. (2008). Organisational justice and extra-role customer service. *European Journal of Work and Organisational Psychology 17*, 327-348.

Morahan-Martin, J., & Schumacher, P. (2003). Loneliness and social uses of the Internet. *Computers in Human Behavior, 19*(6), 659-671.

Morgan, D.L. (2007). Paradigms lost and pragmatism regained: Methodological implications of combining qualitative and quantitative methods. *Journal of Mixed Methods Research,* 1, 48-76.

Morris, S. A., Gullekson, N. L., Brendan, J. M., & Popovich, P. M. (2009). Updating the attitudes towards computer usage scale using American undergraduate students. *Computers in Human Behavior, 25*, 535-543.

Morse, J. M. (1991). Approaches to qualitative-quantitative methodological triangulation. *Nursing Research, 40*, 120-123.

Myers, R. (1990). *Classical and Modern Regression with Applications*. Boston, MA: Duxbury.

Nasi, M., & Koivusilta, L. (2013). Internet and everyday life: The perceived implications of internet use on memory and ability to concentrate. *Cyberpsychology, Behaviour, and Social Networking, 16*(2), 88-93.

National Office of Statistics. (2010). E-commerce and ICT activity 2009. Retrieved from http://www.statistics.gov.uk/pdfdir/ecom1110.pdf.

National Office of Statistics. (2010). Internet access quarterly update. Retrieved from http://www.statistics.gov.uk/pdfdir/ecom1110.pdf

National Office of Statistics. (2013). Internet Access Quarterly Update, Q1 2013. *Statistical Bulletin.* , Retrieved from http://www.ons.gov.uk/ons/dcp171778_310435.pdf

Nelson, D. (1990). Individual adjustments to Information-driven technologies: A critical review. *MIS Quarterly, 14*(1), 79-98.

Newman, I. & Benz, C.R. (1998). *Qualitative-quantitative research methodology: Exploring the interactive continuum.* Carbondale: Southern Illionois University Press

Nie, N. H., Hillygus, D. S., & Erbing, L.(2002). *Internet use, Interpersonal Relations, and Sociability*. Malden, MA: Blackwell Publishers.

Nkosi, Z. Z., Asah, F., & Pillay, P. (2011). Post-basic nursing students' access to and attitudes towards the use of information technology in practice: A descriptive analysis. *Journal of Nursing Management, 19*(7), 876-882.

Nunnally, J. O. (1978). *Psychomatric Theory*. New York: McGraw-Hill.

O'Driscoll, M. P., & O'Driscoll, E. C. (2010). The impact of new technology in the workplace on mental wellbeing In C. L. Cooper, J. Field, U. Goswami, R. Jenkins & B. J. Sahakian (Eds.), *Mental Capital and Wellbeing* (pp. 673-679). Chichester: West Sussex: Wiley-Blackwell.

Ojiako, U., Chipulu, M., Maguire, S., Akinyemi, B., & Johnson, J. (2012). User adoption of mandatory enterprise technology. *Journal of Enterprise Information Management, 25*(4), 373 - 391.

Omnibus.Survey (2008).Harmonised concepts and questions for social data sources: *Secondary standards*. Retrieved from www.ons.gov.uk/ons/guide-method/...set-of.../internet-access.pdf

Orlikowski, W. J., & Iacono, C. S. (2001). Research commentary: Desperately seeking the 'IT' in IT research - A Call to Theorizing the IT Artefact. *Information System Research, 12*(2), 121-134.

Orr, K. (1998). Data Quality and System Theory. *CACM, 41*(2), 66-71.

O'Toole, K. (2000). Study offers early look at how Internet is changing daily life, *Stanford News Service*: Stanford University. Retrieved from http://news.stanford.edu/pr/00/000216internet.html

Oxford Dictionary (1998). *The New Oxford Dictionary of English*. Oxford: Oxford University Press

Pallant, J. (2003). *Survival Guide: A Step by Step Guide to Analysis using SPSS.* Buckingham: Open University Press.

Pascarella, P., & Zellars, K. (1999). Spinning a web to technophobia. *Management Review, 86*(3), 42-43.

Patton, M. Q. (1989). *Utilisation-focused evaluation* (2nd ed.). Newbury Park, CA: Sage.

Pearsall, J. (1998). *The new Oxford dictionary of English*. Oxford University Press: Oxford.

Peters, L. H., & O'Connor, E. J.(1988). *Measuring work obstacles: Procedures, issues, and implications.* . Lexington, MA: Lexington Books.

PEW. (2000). The Pew Internet 7 American Life Project. Retrieved from http://www.pewinternet.org/

PEW. (2003). The Ever-Shifting Internet Population: *A new look at Internet access and the digital divide*. Retrieved from http://www.pewinternet.org/experts/Amanda-Lenhart.aspx?typeFilter=0

Pitt, J., Neville, B., & Witowski, M. (2003). Agent mediated retailing in the connected local community. *Interacting with Computers, 15*(1), 5-32.

Plano Clark, V.L. (2005). *Cross-disciplinary analysis of the use of mixed methods in physics education research, counselling psychology, and primary care* (Doctoral dissertation, University of Nebraska-Lincolin). Dissertation Abstracts International, 66, 02A.

Popovich, P. M., Hyde, K. R., & Zakrajsek, T. (1987). The development of the attitudes towards computer usage scale. *Educational and Psychological Measurement. 47*, 261-269.

Popper, K. (2002). *Popper: The Logic of Scientific Discovery* Oxon: Routledge.

Pratkanis, A. R. & Turner, M. E. (1994). Of what value is a job attitude? A socio-cognitive analysis. *Human Relations*, 47, 1545-1576.

Pringle, J., Drummond, J., McLafferty, E., & Hendry, C. (2011). Interpretative

phenomenological analysis: A discussion and critique. *Nurse Researcher , 18*(3), 20-24.

Qiang, T., Kanliang, W., & Qin, S. (2005). Computer-related technostress in China. *Communications of the ACM, 48*(4), 77-81.

Ragu-Nathan, T. S., Tarafdar, M., Ragu-Nathan, B. S., & Tu, Q. (2008). The consequences of technostress for end users in organisations: Conceptual development and empirical validation. *Information System Research, 19*(4), 417-433.

Reber, A. S. (1995). *The Penguin Dictionary of Psychology*. London: Penguin.

Redman, T. (The impact of poor data quality on a typical enterprise). CACM. *41(2),* 79-82.

Reichers, A. E., Wanous, J. P., & Austin, J. T. (1997). Understanding and managing cynicism about organizational change. *Academy or Management Executive 11*(1), 48-58.

Rennie, D. L. (1999). Qualitative research: a matter of hermeneutics and the sociology of knowledge. In Kopala, M. .& L Suzuki (Ed.), *Using qualitative methods in psychology* (pp. 3-13). Thousand Oaks: Sage.

Reuters. (2010). New Survey Reveals Extent, Impact of Information Overload on Workers; From Boston to Beijing, Professionals Feel Overwhelmed, Demoralized, Retrieved from http://www.reuters.com/article/2010/10/20/idUS128629+20-Oct-2010+BW20101020

Rivard, S., & Huff, S. (1988). Factors of success for end-user computing. *Communications of the ACM, 31*(5), 552-561.

Rizzuto, T. E., & Reeves, J. (2007). A multidisciplinary meta-analysis of human

barriers to technology implementation. *Consulting Psychology Journal: Practice and Research, 59*(3), 226-240.

Roberts, P., & Henderson, R. (2000). Information technology acceptance in a sample of government employees: A test of technology acceptance model. *Interacting with Computers, 12*(5), 427-443.

Robertson, I., & Cooper, C. L. (2011). *Well-being: Productivity and Happiness at Work*. Chippenham & Eastbourne: Palgrave MacMillan.

Robson, C. (2011). *Real World Research*. Padstow: Wiley.

Rodgers, S., & Sheldon, K. M. (2002). An improved way to characterize internet users. *Journal of Advertising Research, September*, 85-94.

Rodman, G., & Fry, K. G. (2011). Communication technology and psychological well-being - Yin, Yang, and the golden mean of media effects. In Y. Amichai-Hamburger (Ed.), *Technology and Psychological Well-being* (pp. 9-33). Cambridge: Cambridge University Press.

Rogers, E. M. (2003). *Diffusion of innovations*. New York: Free Press.

Rossman, G. B., & Wilson, B. L. (1985). Numbers and words: Combining quantitative and qualitative methods in a single large-scale evaluation study. *Evaluation Review, 9*(5), 627-643.

Rorty, R. (1983). *Consequences of Pragmatism*. Minneapolis: University of Minnesota Press.

Rozell, E. J., & Gardner, W. (2000). Cognitive, motivation, and affective processes associated with computer related performance. A path analysis. *Computers in Human Behavior, 23*, 578-590.

Rudestam, K. E., & Newton, R. R. (2001). *Surviving Your Dissertation: A*

Comprehensive Guide to Content and Process (2nd ed.).Thousand Oaks, Sage.

Ryan, R. M., & Deci, E. L. (2001). On happiness and human potentials: A review of research on hedonic and eudaemonic well-being. *Annual Review of Psychology, 52*, 1069-1081.

Ryff, C. D. (1989). Happiness is everything, or is it? Explorations on the meaning of psychological well-being. *Journal of Personality and Social Psychology, 57*(6), 1069-1081.

Ryff, C. D., & Keyes, C. L. M. (1995). The structure of psychological well-being revisited. *Journal of Personality and Social Psychology, 69*(4), 719-727.

Salanova, M., Llorens, S., & Cifre, E. (2013). The dark side of technologies: Technostress among users of information and communication technologies. *International Journal of Psychology, 48*(3), 422 - 438.

Salvendy, G. (1972). Physiological and psychological aspects of paced and unpaced performance. *Acta Physiologica, 42*, 267-275.

SAVO. (2013). Retrieved from http://www.savogroup.com/what-we-do/

Schiffman, L. G., Sherman, E., & Long, M. (2003). Toward a better understanding of the interplay of personal values and the internet. *Psychology & Marketing, 20*(2), 169-186.

Schroeder, R., & Fry, J. (2007). Social science approaches to e-science: Framing an agenda. . *Journal of Computer-Mediated Communication, 12*(2).

Seligman, M. E. P. (1975). *Helplessness: On depression, development and death*. San Francisco: W.H. Freeman & Company.

Seligman, M. E. P., & Csikszentmihalyi, M. (2000). Positive psychology: An introduction. *American Psychologist, 55*(1), 5-14.

Seppala, P. (2001). Experience of stress, musculoskeletal discomfort, and eyestrain in computer-based office work: A study in municipal workplaces. *International Journal of Human -Computer Interaction, 13*, 279-304

Shaft, T. M., Sharfman, M. P., & Wu, W. W. (2004). Reliability assessment of the attitudes towards computers instruments (ATCI). *Computers in Human Behavior, 16*(199-222).

Shapria, I. (2006). What comes next after generation X? Retrieved from http://www.washingtonpost.com/wp-dyn/content/article/2008/07/05/AR2008070501599.html

Shenk, D. (1997). Data smog: *Surviving the information glut*. Retrieved from http://davidshenk.com/essays.html

Sherman, R. C., End, C., Kraan, E., Cole, A., Campbell, J., Birchmeier., Z., et al. (2000). The Internet gender gap among college students: Forgotten but not gone? *Cyberpsychology & Behaviour, 3*, 885-894.

Shu, Q., Tu, Q., & Wang, K. (2011). The impact of computer self-efficacy and technology dependence on computer-related technostress: A social cognitive theory perspective. *International Journal of Human -Computer Interaction, 27*(10), 923-939.

Silvia, P. (2005). Deflecting reactance: The role of similarity in increasing compliance and reducing resistance. *Basic and Applied Psychology, 27*(3), 277-284.

Sinickas, A. D. (2005). The role of intranets and other e-channels in employee communication preferences. *Journal of Website Promotion, 1*(1), 31-51.

Skitka, L. J., & Sargis, E. G. (2005). The internet as psychological laboratory. *Annual Review of Psychology, 57*(January), 529-555.

Smith, A. L., Baxter, R., Boss, S., & Hunton, J. (2012). The dark side of online knowledge sharing. *Journal of Information Systems, 26*(2), 71-91.

Smith, J. A. (2004). Reflecting on the development of interpretative phenomenological analysis and its contribution to qualitative research in psychology. *Research in Psychology, 1*, 39-54.

Smith, J. A. (2007). Hermeneutics, human sciences and health: linking theory and practice. *International Journal of Qualitative Studies on Health and Well-being, 2*, 3-11.

Smith, J. A., Flowers, P., & Larkin, M. (2009). *Interpretative Phenomenological Analysis: Theory, Method and Research.* London: Sage.

Smith, J. A., & Osborn, M. (2008). *Interpretative phenomenological analysis* . London: Sage.

Snyder, C. T., & Lopez, S. J. (2002). *Handbook of Positive Psychology*. New York: Oxford University Press.

Sparrow, B., Liu, J., & Wegner, D. M. (2011). Google effects on memory: Cognitive consequences of having information at our fingertips. *Science, 333*, 776-778.

Spector, P. E. (1986). Perceived control by employees: A meta-analysis of studies concerning autonomy and participation at work. *Human Relations, 39*, 1005-1016.

Speier, C., & Venkatesh, V. (2002). The hidden minefields in the adoption of sales force automation technologies. *Journal of Marketing, 66*(3), 98-111.

Spencer, L., Ritchie, J., Lewis, J., & Dillon, L. (2003). *Quality in Qualitative Evaluation: A Framework for Assessing Research Evidence, a Quality Framework*. London: Cabinet Office

Sproull, L., & Kiesler, S. (1991). *Connections: New Ways of Working in the Networked Organisation.* Cambridge, MA: MIT Press.

Statistics. (1999). *Statistics, Sweden (1999). Statistics Sweden. The Working Enironment 1999 (AM 68 SM 0001)*.

Stephens, M. (Ed.). (1982). *A Question of Generalisability: Theory and Research in Social Education*. Thousand Oaks: Sage.

Stevens, J. (1996). *Applied Multivariate Statistics for the Social Sciences*. Mahway, New Jersey: Lawrence Erlbaum.

Stevens, J. (2002). *Applied Multivariate Statistics for the Social Sciences*. Hillsdale, NJ.: Erlbaum.

Stiroh, K. J. (2002). Information technology and the U.S. productivity revival: What does the Industry data say? *American Economic Review, 92*(5), 1559-1576.

Strathclyde University, (2012) Theoretical Arguments: Theoretical Arguments for Mixed Methods Research. Retrieved from http://www.strath.ac.uk/aer/materials/2designstrategiesineducationalresearch/unit5/theoreticalarguments/

Strauss, A. & Corbin, J. (1998). *Basics of qualitative research: Techniques and procedures for developing grounded theory*. Thousand Oaks: Sage.

Tabachnick, B. G., & Fidell, L. S. (1996). *Using multivariate statistics (3rd edition)*. New York: HarperCollins.

Talkhealth Partnership. (2013). Cost of stress to British economy estimated at £3.7bn. Retrieved from http://www.talkhealthpartnership.com/blog/2012/11/cost-of-stress-to-british-economy-estimated-at-3-7bn-new-research-highlights-more-than-13m-

workers-at-risk-of-mental-health-problems/

Tarafdar, M., Gupta, A., & Turel, O. (2013). The dark side of information technology use. *Information Systems Journal, 23*(3), 269-275.

Tarafdar, M., Tu, Q., & Ragu-Nathan, T. S. (2011). Impact of technostress on end-user satisfaction and performance. *Journal of management information systems, 27*(3), 303-334.

Tarafdar, M., Tu, Q., Ragu-Nathan, T. S., & Ragu-Nathan, B. S. (2011). Crossing to the dark side: Examining the creators, outcomes and inhibitors or technostress. *Communications of the ACM, 54*(9), 113-120.

Tashakorri, A. & Teddlie, C. (2003) *Handbook of mixed methods in social and behavioural research* Thousand Oaks, CA: Sage

Teddlie, C. & Tashakorri, A. (2003) 'Major issues and controversies in the use of mixed methods in the social and behavioural sciences' in (eds.) A Tashakorri A. and C. Teddlie (2003) *Handbook of Mixed Methods in Social and Behavioural Research.* Thousand Oaks, CA: Sage

Tashakkori, A., & Teddlie, C. (2003). *Handbook of Mixed Methods in Social and Behavioural research.* Thousand Oaks, CA: Sage.

Tennant, C. (2001). Work-related stress and depressive disorders. *Journal of Psychosomatic Research, 51*, 697-704.

Tewksbury, D., & Althaus, S. L. (2000). An examination of motivations for using the world wide web. *Communication Research Reports, 17*(2), 127-138.

Thomee, S., Eklof, M., Gustafsson, E., Nilsson, R., & Hagberg, M. (2007). Prevalence or perceived stress, symptoms of depression and sleep disturbances in relation to information and communication technology (ICT)

use among young adults - an explorative prospective study. *Computers in Human Behavior, 23*, 1300-1321.

Thompson, L., & Nadler, J. (2002). Negotiating via information technology: Theory and application. *Journal of Social Issues, 58*(1), 109-124.

University of Michigan. (2013). The Six Types of Socratic Questions Retrieved from http://www.engin.umich.edu/~cre/probsolv/strategy/cthinking.htm

Valkenburg, P. M., & Jochen, P. (2007). Online communication and adolescent well-being: Testing the stimulation versus the displacement hypothesis. *Journal of Computer-Mediated Communication, 12*(4), 1169-1182.

Vieitez, J. C., Carcia, A. D., & Rodriguez, M. T. V. (2001). Perception of job security in a process of technological change: Its influence on psychological well-being. *Behaviour & Information Technology, 20*(3), 213-223.

Waddington, D. (2006). Master data management for business information initiatives. *DM Review, 16*(10), 36-40.

Wagner. (1994). Participation's effect on performance and satisfaction: A reconsideration of research evidence. *Academy of Management Review, 19*, 312-330.

Wallace, P. (2004). *The Psychology of the Internet*. Cambridge: UK: Cambridge Univeristy Press.

Weber, B., Schneider, B., Hornung, S., Wetterling, T., & Fritze, J. (2008). Computer attitude in psychiatric inpatients. *Computers in Human Behavior, 24*(4), 1741-1752.

Weber, R. (2004). The grim reaper: The curse of e-mail. *MIS Quarterly, 28*(3), iii-xiii.

Weil, M. M., & Rosen, L. D. (1997). *TechnoStress: Coping with Technology @Work*

@Home @Play. Canada: Wiley.

Weinberg, A., & Cooper, C. L. (2007). *Surviving the Workplace: A Guide to Emotional Well-Being*. London: Thomson.

Weiser, E. B. (2001). The functions of internet use and their social and psychological consequences. *Cyberpsychology & Behavior, 4*(6), 723-743.

WHO. (2005, January 12-15). *Facing the challenges, building solutions.* Paper presented at the WHO European Ministerial Conference on Mental Health, Helsinki, Finland.

Wicker, A. W. (1969). Attitudes versus actions: The relationship of overt and behavioural responses to attitude objects. *Journal of Social Issues*, 25, 41-78.

Williams, R., & Edge, D. (1996). The social shaping of technology. *Research Policy, 25*(6), 865-899.

Willig, C. (2004). *Introducing Qualitative Research in Psychology: Adventures in Theory and Method*. Buckingham: Open University Press.

Winter, S. J., Chudoba, K., & Gutek, B. A. (1998). Attitudes toward computers: when do they predict computer use? *Information & Management, 34*(5), 275-284.

Wolcott, H. E. (2009). *Writing up qualitative research*. Thousand Oaks: Sage.

Wright, T. A., & Cropanzano, R. (2000). Psychological well-being and job satisfaction as predictors of job performance. *Journal of Occupational Health 5*, 84-94.

Wuensck, K. L. (2004). Principal Component Analysis, *Wuensch's Statistical Lessons - East Carolina University.* Retrieved from http://core.ecu.edu/psyc/wuenschk/statslessons.htm

Wurman, R. S. (1980). *Information Anxiety*. New York: Doubleday.

Yahoo! Groups (2000). IPA Analysis - Interpretative Phenomenological Analysis Researcher Interest Group. Retrieved from http://dir.groups.yahoo.com/neo/groups/nepanmember/conversations/topics/1064

Yardley, L. (2000). Dilemmas in qualitative health research. *Psychology and Health, 15*(2), 215-228.

Yardley, L. (Ed.). (2008). *Demonstrating Validity in Qualitative Psychology*. Los Angeles: Sage.

Yellowlees, P. M., & Brooks, P. M. (1999). Health on line: The future isn't what it used to be. *Medical Journal of Australia, 171*, 522-525.

Yilmaz, E., Aktas, S., Ozer, G., & Ozcan, M. (2013). The factors affecting information technology usage behaviour of tax office employees in the black sea region of Turkey. *Business and Economics Research 4*(2), 1-9.

APPENDIX A

CONSENT FORM – QUALITATIVE

Confidentiality and Data Usage Information

Elizabeth Maxwell, under the control of the University of East London has asked that you participate in a research study into the experience of using net-centric data in the workplace. This study will be conducted in compliance with the British Psychological Society (BPS) Code of Ethical Principles and Guidelines. If you have any complaints about how this study was conducted, then the BPS have a full complaints process with which you can raise your concerns.

This form serves to outline how your personal data will be used during this study and related to final research product.

Purpose of Data Collection

All data collected for this study will be for the exclusive usage of the research. At no time will the data collected be used for any other purpose.

Confidentiality

All data will remain confidential to the researcher, Elizabeth Maxwell. The researcher will upon collecting the data, perform pseudo-anonymization on the data, meaning that data will be made anonymous through a system that only the researcher can link back to you. Other people involved in the study, such as an allocated supervisor, will only have access to the anonymized data. The research will ensure that if any responses are specific enough to potentially identify you that these are not represented in the study. The only time that confidentiality may be breached, by the researcher, is if the researcher assesses that the information you provide indicates that you are at risk or others are at risk, with particular reference to vulnerable adults or children.

Personal Data Processing and Security

All data will be kept in a secured location for the duration of the study, and upon completion will be irrecoverably deleted. The duration of the study is expected to be until the end of 2013.

Final Product of the Study

As mentioned, no data that identifies a living individual will be contained in the resultant publication of the study. If you would like to have received a full copy of the summary of results, then simply make the researcher aware of this request.

Explicit Consent to Take Part in the Study

I ask that you grant me your consent to take part on this research study and that you also consent to the usage of your data.

Please indicate your consent by ticking the box below:

☐ I hereby consent to take part in the outlined study and that my data may be used in accordance with the outline above.

Withdrawal from the Study

You retain the right to withdraw from the study at any time without having to provide an explanation to the researcher. Simply contact the researcher at this point and your data will be removed from the study.

Signed

Participant:	Researcher:
Date:	Date:

APPENDIX B

COVER LETTER QUANTITAIVE

Hi,

I am sure that you will have noticed over the last few years that our XXX and XXX systems have become quite strategic to how we work and communicate as an organisation.

Well, XXXXXX have agreed to participate in an exciting new study investigating internal systems, such as XXX and XXXX, to understand how such systems shape our thinking and sense of well-being in the work environment. Taking part in the research will provide XXXXX feedback and recommendations of how we can enhance the positive experience of these systems within this organisation.

All responses are anonymous and returned to the research group at the University of East London with only a summary being provided back to XXXX of both results and recommendations, no individuals will be identified at any point in the survey.

If you wish to withdraw from the survey at any point then please send an e-mail to the address below. All data will be kept securely for only the duration of the survey, once it is anonymized.

I ask that you take 10 to 15 minutes of your time to contribute to this study and help us work towards improving our work experience through the XXX and XXX systems at XXXX.

Your participation is important to us so please respond before XXXXXX.

I you have any questions about this research please e-mail me or contact the research team at XXXXXXX@uel.ac.uk

Kind regards

APPENDIX C

CONSENT FORM QUANTITATIVE

‘Your consent is required for usage of your data in this research. To **consent** simply submit your completed questionnaire. Your data will then be desensitized and processed anonymously by the researcher.

If it is not your intention to provide your consent, then please exit from this page and do not submit a completed questionnaire.’

APPENDIX D

PTSI DEVELOPMENT AND CHARACTERISTICS

TechnoStress Instrument Characteristics: The test development involved an assessment of the impact of technology on our lives and a categorisation of the areas that represent the following types of TechnoStress (Rosen & Weil, 1997), being technologies impact on:

1. Learning
2. Boundaries
3. Communication
4. Time
5. Family (as this was family explicit it was removed from the survey)
6. Workplace
7. Societal

The measure was developed on a sample size or 808 adults comprised of 4 samples from various organisations ranging in size from 145 to 289. The developed analysis focused on reliability and validity.

All data captured were representative of working adults with the age profile shown in Table D.1.

Table D.1 *Age PSTI Development*

Age	% of Sample
18-25	39%
26-35	26%
36-50	22%
51-64	10%
65+	4%

Participants responded to the original 47-item five-point scale with choices representing ‘Never’, ’A Little’, ’A Fair Amount’, ’ Often’, ’ Very Often’. The items were mostly phrased in a negative direction with only 14 phrased positively.

Reliability Assessment of Original Measure: Reliability measures the extent that a test produces consistent results upon re-administration (Gregory, 2000) and the occurrence of random error (Pallant, 2003). The other aspect of reliability that is important to a measure is the internal consistency representing the extent to which the items of the scale measure the same attribute (Pallant, 2003). The resultant Cronbachs’ alpha for the 47-items was found to be .82 representing internal consistency. For each subscale the Cronbachs’ Alpha are reported in Table D.2.

Table D.2 *PSTI Sub-Scales Reliability*

Subscale	**Cronbachs’ Alpha**
Learning	0.73
Communication	0.54
Time	0.50
Workplace	0.61
Societal	0.57
Boundary	0.27
Family	0.31

Rosen and Weil (1999) instruct caution when using subscales Boundary and Family due to low Cronbachs’ Alpha Scores.

Validity Assessment of Original Measure: It is important to establish validity as this ensures that the scale actually measures what it purports to measure. There are three ways to assess validity; being content validity, criterion validity and construct validity (Pallant, 2003). Content looks at how effectively the sampling is from the entire universe of content (Pallant, 2003). Criterion validity investigates the

relationship between the scale and a definable criteria, whereas construct validity looks at the scale relative to a theoretical construct such as a hypothesis about the variable under study (Pallant, 2003). Construct validity looks at two aspects, these being convergent or related and discriminate or unrelated validity (Pallant, 2003).

When this measure was administered, the validity against other measures of similar constructs was checked by also administrating the other measures in the same survey. The other measures and their correlation with the PTSI are listed in the Table D.3.

Table D.3 *PTSI Correlated with Other Measures*

Measurement Tool	**Specific Scale**	**Correlation with PTSI**
Feeling about the prospect of using new technology (5 point scale)	5 point	.32***
Current attitude toward technology	5 point	.43***
Current level of anxiety about technology	5 point	.45***
Adjective checklist - positive	30 item list	-.28***
Adjective checklist - negative adjectives	30 item list	.49***
Level of technophobia	4-item scale (Patrikas, 1999)	.38***
Telecommunication use	(Patrikas, 1999)	-.29***
Application use	(Patrikas, 1999)	-.27***
Operating system skill	(Patrikas, 1999)	-.27***
Knowledge of computers and technology	one half of Speilberger's State-Trait Anxiety	-.44***
State Anxiety Inventory		.22**
Self-Efficacy	10-item scale	-.39***

Rosen and Weil (1999) confirm that the PTSI is a bias-free measure of technological stress.

APPENDIX E

PSYCHOLOGICAL WELL-BEING DEVELOPMENT AND CHARACTERISTICS

Psychological Well-Being Assessment Instrument Characteristics: The full Scales of Psychological Well-Being were developed in 1989 by Ryff and then updated in 1995 to provide a shorter measure of PWB. Previous measures of psychological well-being prior to Ryffs' instrument had not been theoretically guided (Ryff, 1989). The scale measures psychological well-being at a moment in time rather than as an enduring trait (Ryff, 1989; Ryff & Keyes, 1995). Ryff operationalized 6 dimensions of psychological well-being, being (Ryff, 1989; Ryff & Keyes, 1995):

1. Self- Acceptance: A central feature of mental health where a positive attitude to oneself is present.
2. Positive Relations with Others: Having satisfying relationships with others
3. Autonomy: Having independence and being self-determining
4. Environmental Mastery: Ability to select environments suitable to the self
5. Purpose in Life: Feeling a sense of purpose and meaning to existence
6. Personal Growth: Develop potential and expand as a person

The initial development sample comprised of 321 of adults who were assessed as healthy, educated and financially stable. Initially, items were generated by three writers resulting in 32 items per scale being administered to the sample. This was then test-retest checked with 117 of the participants within 6-weeks of the original test. The internal consistency (alpha) coefficients are represented Table E.1.

Table E.1 *Psychological Well-Being - Development of Scale Inter-item Correlation (Alpha) Coefficients*

Dimension	Test	Re-Test
Self- Acceptance	.93	.85
Positive Relations with Others	.91	.83
Autonomy	.86	.88
Environmental Mastery	.90	.81
Purpose in Life	.90	.82
Personal Growth	.87	.81

In order to address the validity of the dimensions, inter-correlations were calculated with prior measures of positive functioning that showed positive significant coefficients from .25 to .73. Likewise, with previous negative measures, the coefficients ranged between -.30 to -.60, providing evidence for validity.

Next, inter-correlations for the new instrument were calculated providing coefficients from .32 to .76. The scale and previous scale data was then factor analysed using principal component analysis, Varimax, to confirm the dimensions.

In 1995 the measure was then tested again by Ryff (1995). This time the sample was of 1108 randomly chosen non-institutionalized adults over 25 years old, from a national telephone interview. However, only 3 items per scale were used to measure the 6 dimensions, due to time and cost restrictions. The shortened scales correlated from .70 to .89 with the 20-item parent scales detailed from the 1989 study. Preliminary results indicated that psychometric criteria were met in the 3-item sub-scales. Scale inter-correlations are modest ranging from .13 (purpose in life and autonomy) and .46 (Self-acceptance and environmental mastery). And internal

consistency (alpha) coefficients are in Table E.3, Ryff (1995) refers to these as low to modest.

Table E.3 *Psychological Well-Being Internal Consistency Alpha Coefficients*

Dimension	**Alpha**
Self- Acceptance	.52
Positive Relations with Others	.56
Autonomy	.37
Environmental Mastery	.49
Purpose in Life	.33
Personal Growth	.40

Again, this reduced 3-item per scale was correlated with other measures to determine validity. Although Ryff highlights that they have low internal consistency and that they should not be used for high quality assessment of well-being, the researcher felt that due to time and cost constraints that this measure would reflect to an acceptable extent of psychological well-being for this exploratory study.

APPENDIX F

ATCU DEVELOPMENT AND CHARACTERISTICS

ATCU Assessment Instrument Development and Characteristics: The original measure was developed by Popovich et al. (1987) through two studies. First, 365 general psychology undergraduates took part. The 40-item ATCU was based on previous literature with computer related items added. Not only were surveys administered in person, but a retest was performed on 44 participants via the post within 2 weeks of the original test. Results showed internal consistency alpha at .88 and the test retest was .84 with significant correlations. A principal component factor analysis with Varimax rotation determined 12 factors all with eigenvalue > 1 accounting for 57.5 per cent of the scale variance. Factors were reduced to five and named. The scale was determined as reliable. However, the large number of factors indicated further improvement was required. The second study involved 351 general undergraduate students and only 20 items were used in the scale. This time the internal consistency (alpha) was .84 and retest correlation .91. Principal component factor analysis showed 4 factors with eigenvalue >1. The instrument was deemed as reliable.

Over the 20 years since the instruments creation, as there have been many technological advances, it was decided by the developer that the instrument would be changed to 'reflect more recent technological trends' (Morris et al., 2009). The instrument was extensively updated again in a three step process with the first 2 steps being similar to the original instrument construction resulting in a 22-item scale. After step 2, the 22 items showed an internal consistency reliability estimate

(alpha) of .83 and a test-retest of .93. The Varimax rotation identified a 4 factor solution accounting for 45 per cent of the variance. The internal reliabilities of the subscales showed values of .64, .71, .69 and .58. This led to questions around whether the scale maintained a one-dimensional scale or a 4 factor solution, so a third step was conducted.

The third step involved confirmatory factor analysis and structured equation modelling with a 226 sample of students from all colleges of the university. The model for the 4 factors showed a better fit. Finally, the updated instrument called the ‘revised ATCU’ was deemed as reliable for usage, and this is the instrument used in the present study.

APPENDIX G

COMPLETE ADMINISTERED SURVEY

General Information About Yourself:

***1. What job function describes what you do today?**

○ HR ○ Administration ○ Financial ○ Sales ○ Technical Enterprise (Pre or Post Sales) ○ Technical Distributed (Pre or Post Sales) ○ Solutions Delivery ○ Product Development ○ IS ○ Managerial ○ Other

***2. What is your gender?**

○ Male ○ Female

***3. Indicate your age range in the appropriate category**

○ <20 ○ 20-25 ○ 26-30 ○ 31-35 ○ 36-40 ○ 41-45 ○ 46-50 ○ 51-55 ○ >55

This Section Explores Your Reaction to the Technology That Surrounds Us:

***4. Select what single statement best describes your feeling about technology**

○ I am eager, and one of the first to try new technology
○ I am willing to try new technology only after it has been tested and proven
○ I would rather wait until I need to use new technology
○ I wait until I am required to use new technology
○ I do not want to use new technology at all

***5. I am comfortable learning new technology.**

○ 1 - Never ○ 2 - A little ○ 3 - A fair amount ○ 4 - Often ○ 5 - Very Often

***6. Technology's beeps and buzzing sounds bother me.**

○ 1 - Never ○ 2 - A little ○ 3 - A fair amount ○ 4 - Often ○ 5 - Very Often

***7. I get distracted by communication technologies like the telephone, fax machine, cell phones and pagers.**

○ 1 - Never ○ 2 - A little ○ 3 - A fair amount ○ 4 - Often ○ 5 - Very Often

***8. I have enough free time in my life.**

○ 1 - Never ○ 2 - A little ○ 3 - A fair amount ○ 4 - Often ○ 5 - Very Often

***9. I know how to deal with technological malfunctions or problems.**

○ 1 - Never ○ 2 - A little ○ 3 - A fair amount ○ 4 - Often ○ 5 - Very Often

***10. It seems that when a technological device needs repair it is easier to discard and replace it rather than fix it**

○ 1 - Never ○ 2 - A little ○ 3 - A fair amount ○ 4 - Often ○ 5 - Very Often

***11. I understand the "language" of technology (e.g., RAM, ROM, virus, gigabytes, server, etc.).**

○ 1 - Never ○ 2 - A little ○ 3 - A fair amount ○ 4 - Often ○ 5 - Very Often

***12. My timesaving devices save me time.**

○ 1 - Never ○ 2 - A little ○ 3 - A fair amount ○ 4 - Often ○ 5 - Very Often

***13. Having technology available at home leads me to work longer hours.**

○ 1 - Never ○ 2 - A little ○ 3 - A fair amount ○ 4 - Often ○ 5 - Very Often

***14. Solving a technological problem seems like a fun challenge.**

○ 1 - Never ○ 2 - A little ○ 3 - A fair amount ○ 4 - Often ○ 5 - Very Often

***15. I set clear limits on the times and ways for people to contact me.**

○ 1 - Never ○ 2 - A little ○ 3 - A fair amount ○ 4 - Often ○ 5 - Very Often

***16. I like to leave messages when I know I will not have to talk directly to the person.**

○ 1 - Never ○ 2 - A little ○ 3 - A fair amount ○ 4 - Often ○ 5 - Very Often

***17. I get things done in the time I have planned to complete them.**

○ 1 - Never ○ 2 - A little ○ 3 - A fair amount ○ 4 - Often ○ 5 - Very Often

***18. Technology interferes with my personal creativity.**

○ 1 - Never ○ 2 - A little ○ 3 - A fair amount ○ 4 - Often ○ 5 - Very Often

***19. I worry about students gettting accurate information on the Internet.**

○ 1 - Never ○ 2 - A little ○ 3 - A fair amount ○ 4 - Often ○ 5 - Very Often

***20. I find complex voice-mail systems irritating and time consuming.**

○ 1 - Never ○ 2 - A little ○ 3 - A fair amount ○ 4 - Often ○ 5 - Very Often

***21. I find myself doing more than one task at a time.**

○ 1 - Never ○ 2 - A little ○ 3 - A fair amount ○ 4 - Often ○ 5 - Very Often

***22. Using technology at home after work hours interferes with my free time.**

○ 1 - Never ○ 2 - A little ○ 3 - A fair amount ○ 4 - Often ○ 5 - Very Often

***23. I find most technology easy to learn.**

○ 1 - Never ○ 2 - A little ○ 3 - A fair amount ○ 4 - Often ○ 5 - Very Often

***24. I believe I am forgetting how to do things the "old fashioned" way (without using technology).**

○ 1 - Never ○ 2 - A little ○ 3 - A fair amount ○ 4 - Often ○ 5 - Very Often

***25. When I leave a message for someone I worry when I'll hear back from the person.**

○ 1 - Never ○ 2 - A little ○ 3 - A fair amount ○ 4 - Often ○ 5 - Very Often

***26. I find myself interrupting what I am doing to attend to something else.**

○ 1 - Never ○ 2 - A little ○ 3 - A fair amount ○ 4 - Often ○ 5 - Very Often

***27. Timesaving devises end up requiring more time, rather than saving time.**

○ 1 - Never ○ 2 - A little ○ 3 - A fair amount ○ 4 - Often ○ 5 - Very Often

***28. The amount of information available about me through technology worries me.**

***29. I worry that some people are falling further behind because of their lack of knowledge about technology.**

○ 1 - Never ○ 2 - A little ○ 3 - A fair amount ○ 4 - Often ○ 5 - Very Often

***30. When I talk on the telephone I pay attention to the conversation and do not do anything else.**

○ 1 - Never ○ 2 - A little ○ 3 - A fair amount ○ 4 - Often ○ 5 - Very Often

***31. Technology changes so fast it is hard to keep up.**

○ 1 - Never ○ 2 - A little ○ 3 - A fair amount ○ 4 - Often ○ 5 - Very Often

***32. When technology has problems, I believe they are fixable**

○ 1 - Never ○ 2 - A little ○ 3 - A fair amount ○ 4 - Often ○ 5 - Very Often

***33. I worry if I don't check my messages for a while.**

○ 1 - Never ○ 2 - A little ○ 3 - A fair amount ○ 4 - Often ○ 5 - Very Often

***34. I feel overloaded by all the messages I need to answer in a day.**

○ 1 - Never ○ 2 - A little ○ 3 - A fair amount ○ 4 - Often ○ 5 - Very Often

***35. It is difficult for me to concentrate on work because my mind wanders to other things I need to do.**

○ 1 - Never ○ 2 - A little ○ 3 - A fair amount ○ 4 - Often ○ 5 - Very Often

***36. Technology invades people's privacy.**

○ 1 - Never ○ 2 - A little ○ 3 - A fair amount ○ 4 - Often ○ 5 - Very Often

***37. Technology isolates people.**

○ 1 - Never ○ 2 - A little ○ 3 - A fair amount ○ 4 - Often ○ 5 - Very Often

***38. I am comfortable with all the new technology that is showing up in my environment (e.g., grocery stores, libraries, gas stations, banks, etc.).**

○ 1 - Never ○ 2 - A little ○ 3 - A fair amount ○ 4 - Often ○ 5 - Very Often

***39. I am an accurate time estimator.**

○ 1 - Never ○ 2 - A little ○ 3 - A fair amount ○ 4 - Often ○ 5 - Very Often

***40. Technology makes my job more complex.**

○ 1 - Never ○ 2 - A little ○ 3 - A fair amount ○ 4 - Often ○ 5 - Very Often

***41. I feel I need to respond to messages as soon as possible.**

○ 1 - Never ○ 2 - A little ○ 3 - A fair amount ○ 4 - Often ○ 5 - Very Often

***42. I believe that most people know more about technology than I do.**

○ 1 - Never ○ 2 - A little ○ 3 - A fair amount ○ 4 - Often ○ 5 - Very Often

***43. I get frustrated figuring out the best way to reach someone.**

○ 1 - Never ○ 2 - A little ○ 3 - A fair amount ○ 4 - Often ○ 5 - Very Often

***44. I get impatient waiting for technological devices to finish their work.**

○ 1 - Never ○ 2 - A little ○ 3 - A fair amount ○ 4 - Often ○ 5 - Very Often

***45. I lose track of time when using certain types of technology.**

○ 1 - Never ○ 2 - A little ○ 3 - A fair amount ○ 4 - Often ○ 5 - Very Often

***46. I feel as up-to-date on technology as my peers**

○ 1 - Never ○ 2 - A little ○ 3 - A fair amount ○ 4 - Often ○ 5 - Very Often

***47. I am concerned about the privacy of technological communications.**

○ 1 - Never ○ 2 - A little ○ 3 - A fair amount ○ 4 - Often ○ 5 - Very Often

Your Usgae & Expereince of

***48. How frequently do you access in a day?**

○ Constantly active all day ○ >20 times ○ 10-19 times ○ 5-10 times ○ 1-4 times ○ Only as a last resort

***49. I think is an effective communication tool**

○ 1 - Disagree Strongly	○ 2 - Disagree	○ 3 - Disagree Slightly	○ 4 - Neutral	○ 5 - Agree Slightly	○ 6 - Agree	○ 7 - Agree Strongly

***50. I struggle to find what I need on**

○ 1 - Disagree Strongly	○ 2 - Disagree	○ 3 - Disagree Slightly	○ 4 - Neutral	○ 5 - Agree Slightly	○ 6 - Agree	○ 7 - Agree Strongly

***51. I like to contribute to (eg blogs, personal profiles etc)**

○ 1 - Disagree Strongly	○ 2 - Disagree	○ 3 - Disagree Slightly	○ 4 - Neutral	○ 5 - Agree Slightly	○ 6 - Agree	○ 7 - Agree Strongly

***52. communications are just the right frequency**

○ 1 - Disagree Strongly	○ 2 - Disagree	○ 3 - Disagree Slightly	○ 4 - Neutral	○ 5 - Agree Slightly	○ 6 - Agree	○ 7 - Agree Strongly

***53. I don't get any valuable information from**

○ 1 - Disagree Strongly	○ 2 - Disagree	○ 3 - Disagree Slightly	○ 4 - Neutral	○ 5 - Agree Slightly	○ 6 - Agree	○ 7 - Agree Strongly

***54. I would rather ask someone than access**

○ 1 - Disagree Strongly	○ 2 - Disagree	○ 3 - Disagree Slightly	○ 4 - Neutral	○ 5 - Agree Slightly	○ 6 - Agree	○ 7 - Agree Strongly

***55. It is always easy to see when something important has changed on**

○ 1 - Disagree Strongly	○ 2 - Disagree	○ 3 - Disagree Slightly	○ 4 - Neutral	○ 5 - Agree Slightly	○ 6 - Agree	○ 7 - Agree Strongly

***56. Communication content is easy to follow**

○ 1 - Disagree	○ 2 -	○ 3 - Disagree	○ 4 -	○ 5 - Agree	○ 6 -	○ 7 - Agree

Strongly Disagree Slightly Neutral Slightly Agree Strongly

***57. enables me to work more efficiently**

1 - Disagree Strongly | 2 - Disagree | 3 - Disagree Slightly | 4 - Neutral | 5 - Agree Slightly | 6 - Agree | 7 - Agree Strongly

***58. There is so much informaiton on that I am overwhelmed**

1 - Disagree Strongly | 2 - Disagree | 3 - Disagree Slightly | 4 - Neutral | 5 - Agree Slightly | 6 - Agree | 7 - Agree Strongly

***59. I easily find what I am looking for on**

1 - Disagree Strongly | 2 - Disagree | 3 - Disagree Slightly | 4 - Neutral | 5 - Agree Slightly | 6 - Agree | 7 - Agree Strongly

***60. I enjoy interacting with my colleagues on**

1 - Disagree Strongly | 2 - Disagree | 3 - Disagree Slightly | 4 - Neutral | 5 - Agree Slightly | 6 - Agree | 7 - Agree Strongly

***61. I would rather ask someone than access**

1 - Disagree Strongly | 2 - Disagree | 3 - Disagree Slightly | 4 - Neutral | 5 - Agree Slightly | 6 - Agree | 7 - Agree Strongly

***62. There is so much informaiton on that I am overwhelmed**

1 - Disagree Strongly | 2 - Disagree | 3 - Disagree Slightly | 4 - Neutral | 5 - Agree Slightly | 6 - Agree | 7 - Agree Strongly

***63. is a valuable resouce to me**

1 - Disagree Strongly | 2 - Disagree | 3 - Disagree Slightly | 4 - Neutral | 5 - Agree Slightly | 6 - Agree | 7 - Agree Strongly

***64. enables me to work more efficiently**

1 - Disagree Strongly | 2 - Disagree | 3 - Disagree Slightly | 4 - Neutral | 5 - Agree Slightly | 6 - Agree | 7 - Agree Strongly

65. Any other comments regarding

Your View of Computers

***66. I like to keep up with computers and other technological advances.**

1 - Disagree Strongly	2 - Disagree	3 - Disagree Slightly	4 - Neutral	5 - Agree Slightly	6 - Agree	7 - Agree Strongly

***67. Using a computer is too time consuming.**

1 - Disagree Strongly	2 - Disagree	3 - Disagree Slightly	4 - Neutral	5 - Agree Slightly	6 - Agree	7 - Agree Strongly

***68. I would prefer to purchase products at a computerized self-checkout than wait for a store clerk.**

1 - Disagree	2 -	3 - Disagree	4 -	5 - Agree	6 -	7 - Agree

***69. I know that I will understand how to use computers.**

1 - Disagree Strongly	2 - Disagree	3 - Disagree Slightly	4 - Neutral	5 - Agree Slightly	6 - Agree	7 - Agree Strongly

***70. I feel that having a computer at work helps me with my job.**

1 - Disagree Strongly	2 - Disagree	3 - Disagree Slightly	4 - Neutral	5 - Agree Slightly	6 - Agree	7 - Agree Strongly

***71. I prefer to use a PDA (Palm Pilot, Blackberry, etc.) rather than writing my daily tasks in a traditional day planner.**

1 - Disagree Strongly	2 - Disagree	3 - Disagree Slightly	4 - Neutral	5 - Agree Slightly	6 - Agree	7 - Agree Strongly

***72. I like to play computer games.**

***73. I feel that the use of computers in schools will interfere with learning mathematics.**

1 - Disagree Strongly	2 - Disagree	3 - Disagree Slightly	4 - Neutral	5 - Agree Slightly	6 - Agree	7 - Agree Strongly

***74. I prefer to use an automated-teller machine (ATM) rather than go into the bank.**

1 - Disagree Strongly	2 - Disagree	3 - Disagree Slightly	4 - Neutral	5 - Agree Slightly	6 - Agree	7 - Agree Strongly

***75. I have had more bad than good experiences with computers.**

1 - Disagree Strongly	2 - Disagree	3 - Disagree Slightly	4 - Neutral	5 - Agree Slightly	6 - Agree	7 - Agree Strongly

***76. I feel that the use of computers in schools will negatively affect people's reading and writing abilities**

1 - Disagree Strongly	2 - Disagree	3 - Disagree Slightly	4 - Neutral	5 - Agree Slightly	6 - Agree	7 - Agree Strongly

***77. I think that computers and other technological advances have helped to improve our lives.**

1 - Disagree Strongly	2 - Disagree	3 - Disagree Slightly	4 - Neutral	5 - Agree Slightly	6 - Agree	7 - Agree Strongly

***78. I feel I have control over what I do when I use a computer.**

1 - Disagree Strongly	2 - Disagree	3 - Disagree Slightly	4 - Neutral	5 - Agree Slightly	6 - Agree	7 - Agree Strongly

***79. I have problems programming computerized items such as cell phones, VCR's and mp3 players.**

1 - Disagree Strongly	2 - Disagree	3 - Disagree Slightly	4 - Neutral	5 - Agree Slightly	6 - Agree	7 - Agree Strongly

***80. When learning a new task, I would rather follow an interactive computer program than learn from someone in person.**

1 - Disagree Strongly	2 - Disagree	3 - Disagree Slightly	4 - Neutral	5 - Agree Slightly	6 - Agree	7 - Agree Strongly

***81. When searching for research information, I would rather read books, magazines, and newspapers than browse the Internet.**

1 - Disagree Strongly	2 - Disagree	3 - Disagree Slightly	4 - Neutral	5 - Agree Slightly	6 - Agree	7 - Agree Strongly

***82. I would like to have more computerized features in my car such as GPS, CD player, etc.**

1 - Disagree Strongly	2 - Disagree	3 - Disagree Slightly	4 - Neutral	5 - Agree Slightly	6 - Agree	7 - Agree Strongly

***83. I enjoy using Power Point or other computerized visual aids to accompany my presentations.**

1 - Disagree Strongly	2 - Disagree	3 - Disagree Slightly	4 - Neutral	5 - Agree Slightly	6 - Agree	7 - Agree Strongly

***84. I feel that computers limit my creativity.**

1 - Disagree Strongly	2 - Disagree	3 - Disagree Slightly	4 - Neutral	5 - Agree Slightly	6 - Agree	7 - Agree Strongly

***85. I would rather shop online than in a physical store.**

1 - Disagree Strongly	2 - Disagree	3 - Disagree Slightly	4 - Neutral	5 - Agree Slightly	6 - Agree	7 - Agree Strongly

***86. I feel comfortable hooking up my computer and installing software.**

1 - Disagree Strongly	2 - Disagree	3 - Disagree Slightly	4 - Neutral	5 - Agree Slightly	6 - Agree	7 - Agree Strongly

***87. I enjoy using the computer to pass time and/or for fun.**

1 - Disagree Strongly	2 - Disagree	3 - Disagree Slightly	4 - Neutral	5 - Agree Slightly	6 - Agree	7 - Agree Strongly

Your Well-being at Work - Please Answer These Questions With The Work Environment in Mind

***88. In general, I feel I am in charge of the situation in which I live**

1 - Disagree Strongly	2 - Disagree	3 - Disagree Slightly	4 - Agree Slightly	5 - Agree	6 - Agree Strongly

***89. When I look at the story of my life, I am pleased with how things have turned out**

1 - Disagree Strongly	2 - Disagree	3 - Disagree Slightly	4 - Agree Slightly	5 - Agree	6 - Agree Strongly

***90. Maintaining close relationships has been difficult and frustrating for me.**

1 - Disagree Strongly	2 - Disagree	3 - Disagree Slightly	4 - Agree Slightly	5 - Agree	6 - Agree Strongly

***91. The demands of everyday life often get me down**

○ 1 - Disagree Strongly ○ 2 - Disagree ○ 3 - Disagree Slightly ○ 4 - Agree Slightly ○ 5 - Agree ○ 6 - Agree Strongly

***92. I live life one day at a time and don't really think about the future**

○ 1 - Disagree Strongly ○ 2 - Disagree ○ 3 - Disagree Slightly ○ 4 - Agree Slightly ○ 5 - Agree ○ 6 - Agree Strongly

***93. I am quite good at managing the many responsibilities of my daily life**

○ 1 - Disagree Strongly ○ 2 - Disagree ○ 3 - Disagree Slightly ○ 4 - Agree Slightly ○ 5 - Agree ○ 6 - Agree Strongly

***94. I like most aspects of my personality.**

○ 1 - Disagree Strongly ○ 2 - Disagree ○ 3 - Disagree Slightly ○ 4 - Agree Slightly ○ 5 - Agree ○ 6 - Agree Strongly

***95. I think it is important to have new experiences that challenge how you think about yourself and the world**

○ 1 - Disagree Strongly ○ 2 - Disagree ○ 3 - Disagree Slightly ○ 4 - Agree Slightly ○ 5 - Agree ○ 6 - Agree Strongly

***96. I tend to be influenced by people with strong opinions**

○ 1 - Disagree Strongly ○ 2 - Disagree ○ 3 - Disagree Slightly ○ 4 - Agree Slightly ○ 5 - Agree ○ 6 - Agree Strongly

APPENDIX H

INTERVIEW OPENING QUESTIONS QUALITATIVE

'I want to understand how people experience work now that we have all this information available to us. It's called net-centric system information… So, I'm trying to understand, how does this make people feel about their job? How does it impact their job? You know is it good or bad, how do they feel about this? How has work changed because of this, and what is the change to work?'

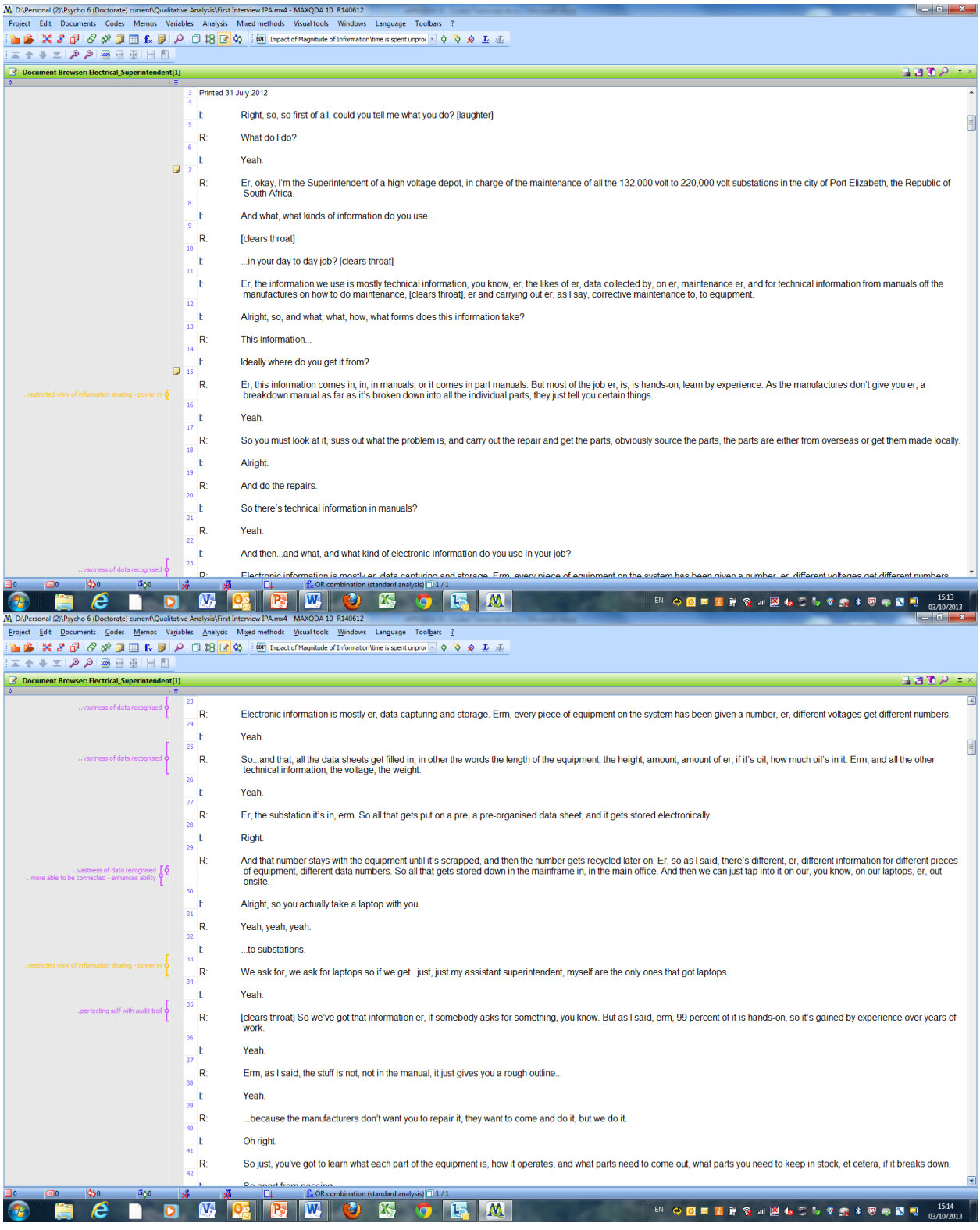
APPENDIX I

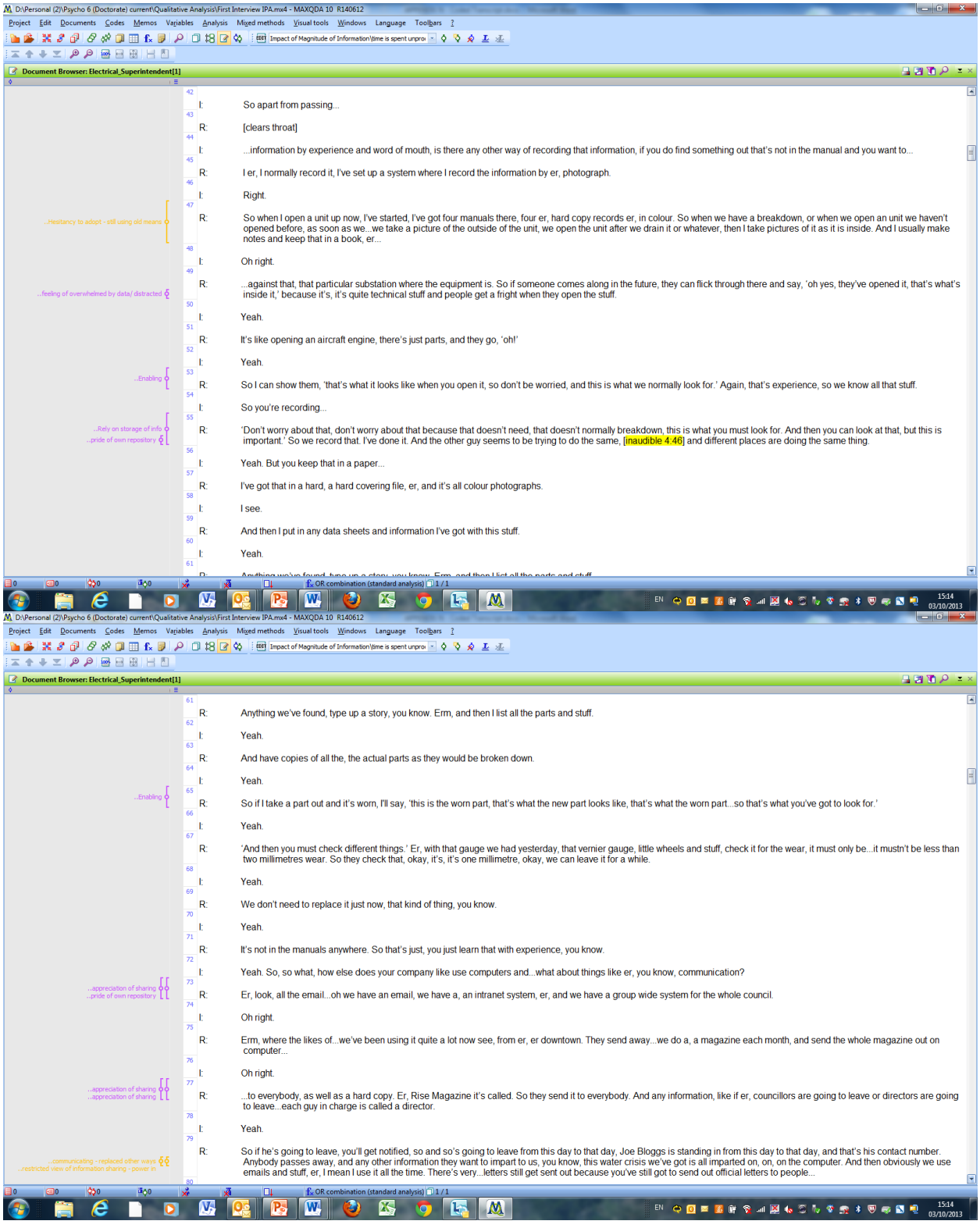
RESEARCHER'S BRACKETING

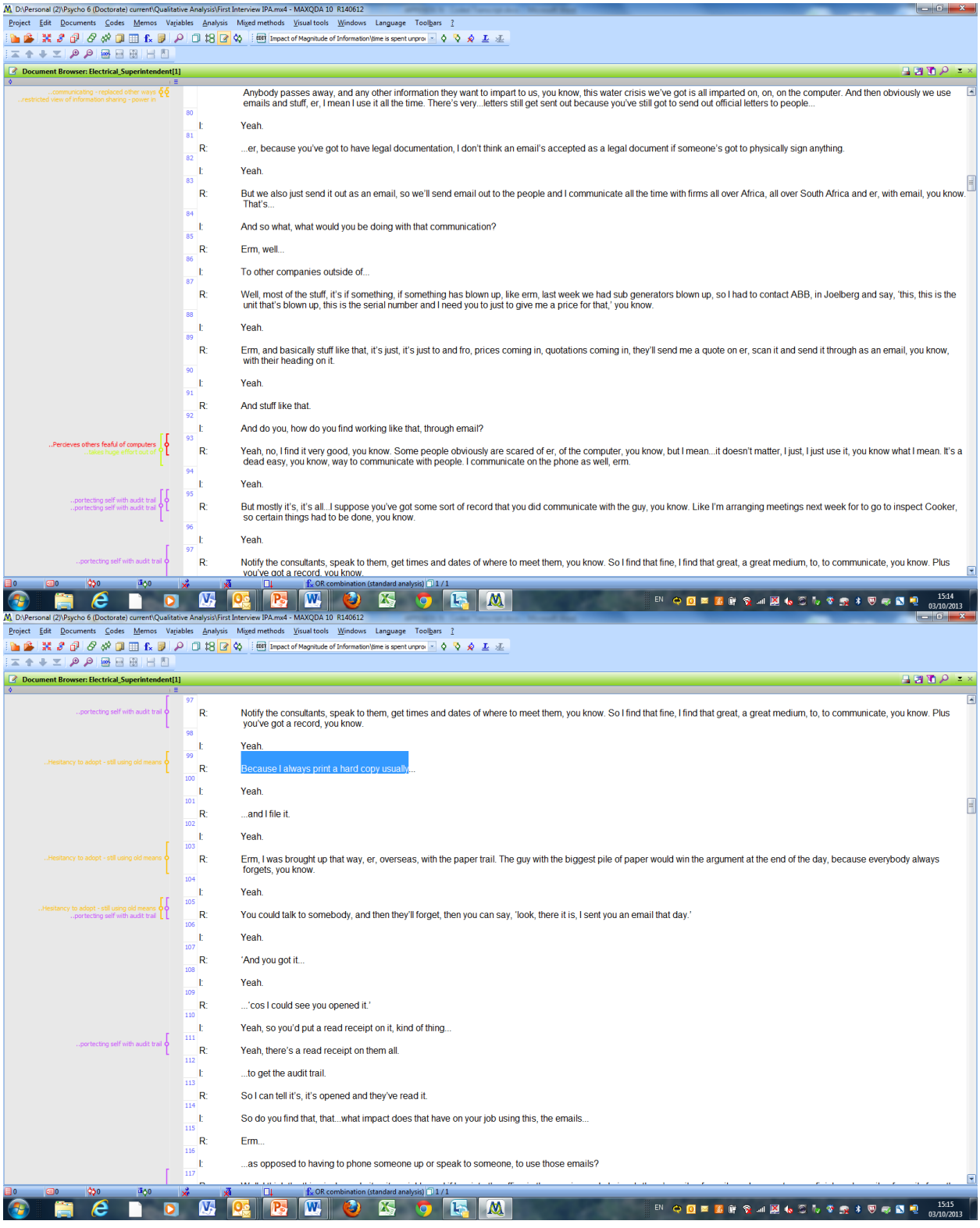
- Awareness of a lot of information being available especially when doing research
- Difficult to maintain a pure stream of process flow through data, get side tracked down different paths due to links in information causing me to forget what I was looking for in the first place
- Instant access to people is fantastic, can have research articles from all over the world and speak to people like your know then on this type of forum, even although don't
- Easy to share info and in my team we work remotely it is vital
- Difficult with search engines filtering information, becoming too commercial
- Not easy to get to the right information, can waste lots of time
- Like that information can be easily shared and expanded – stops having to re-invent the wheel – saves time.
- Sometime the presentation of information is difficult to follow, I am more structured in how I process information and I don't like the intuitive approach of the net as I don't understand it.
- Much frustration when the technology fails, and usually it is when I have a deadline, so it causes me much stress.

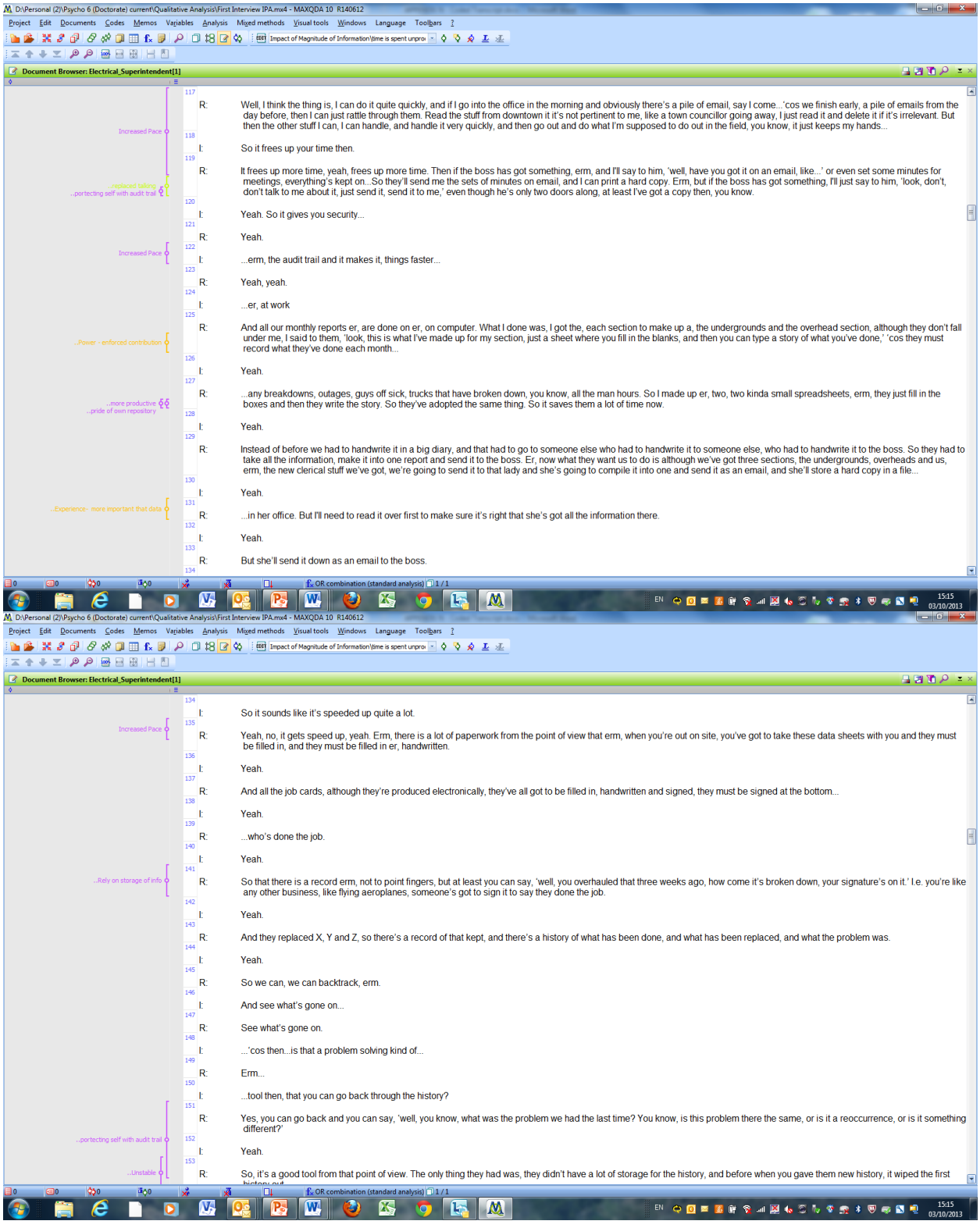
APPENDIX J

EXAMPLE CODED TRANSCRIPT




D:\Personal (2)\Psycho 6 (Doctorate) current\Qualitative Analysis\First Interview IPA.mx4 - MAXQDA 10 R140612
Project Edit Documents Codes Memos Variables Analysis Mixed methods Visual tools Windows Language Toolbars ?
Document Browser: Electrical_Superintendent[1]
I: So apart from passing...
R: [clears throat]
I: ...information by experience and word of mouth, is there any other way of recording that information, if you do find something out that's not in the manual and you want to...
R: I er, I normally record it, I've set up a system where I record the information by er, photograph.
I: Right.
..Hesitancy to adopt - still using old means
R: So when I open a unit up now, I've started, I've got four manuals there, four er, hard copy records er, in colour. So when we have a breakdown, or when we open an unit we haven't opened before, as soon as we...we take a picture of the outside of the unit, we open the unit after we drain it or whatever, then I take pictures of it as it is inside. And I usually make notes and keep that in a book, er...
I: Oh right.
..feeling of overwhelmed by data/ distracted
R: ...against that, that particular substation where the equipment is. So if someone comes along in the future, they can flick through there and say, 'oh yes, they've opened it, that's what's inside it,' because it's, it's quite technical stuff and people get a fright when they open the stuff.
I: Yeah.
R: It's like opening an aircraft engine, there's just parts, and they go, 'oh!'
I: Yeah.
..Enabling
R: So I can show them, 'that's what it looks like when you open it, so don't be worried, and this is what we normally look for.' Again, that's experience, so we know all that stuff.
I: So you're recording...
..Rely on storage of info
..pride of own repository
R: 'Don't worry about that, don't worry about that because that doesn't need, that doesn't normally breakdown, this is what you must look for. And then you can look at that, but this is important.' So we record that. I've done it. And the other guy seems to be trying to do the same, [inaudible 4:46] and different places are doing the same thing.
I: Yeah. But you keep that in a paper...
R: I've got that in a hard, a hard covering file, er, and it's all colour photographs.
I: I see.
R: And then I put in any data sheets and information I've got with this stuff.
I: Yeah.
OR combination (standard analysis)
15:14
03/10/2013
D:\Personal (2)\Psycho 6 (Doctorate) current\Qualitative Analysis\First Interview IPA.mx4 - MAXQDA 10 R140612
Document Browser: Electrical_Superintendent[1]
R: Anything we've found, type up a story, you know. Erm, and then I list all the parts and stuff.
I: Yeah.
R: And have copies of all the, the actual parts as they would be broken down.
I: Yeah.
..Enabling
R: So if I take a part out and it's worn, I'll say, 'this is the worn part, that's what the new part looks like, that's what the worn part...so that's what you've got to look for.'
I: Yeah.
R: 'And then you must check different things.' Er, with that gauge we had yesterday, that vernier gauge, little wheels and stuff, check it for the wear, it must only be...it mustn't be less than two millimetres wear. So they check that, okay, it's, it's one millimetre, okay, we can leave it for a while.
I: Yeah.
R: We don't need to replace it just now, that kind of thing, you know.
I: Yeah.
R: It's not in the manuals anywhere. So that's just, you just learn that with experience, you know.
I: Yeah. So, so what, how else does your company like use computers and...what about things like er, you know, communication?
..appreciation of sharing
..pride of own repository
R: Er, look, all the email...oh we have an email, we have a, an intranet system, er, and we have a group wide system for the whole council.
I: Oh right.
R: Erm, where the likes of...we've been using it quite a lot now see, from er, er downtown. They send away...we do a, a magazine each month, and send the whole magazine out on computer...
I: Oh right.
..appreciation of sharing
..appreciation of sharing
R: ...to everybody, as well as a hard copy. Er, Rise Magazine it's called. So they send it to everybody. And any information, like if er, councillors are going to leave or directors are going to leave...each guy in charge is called a director.
I: Yeah.
..communicating - replaced other ways
..restricted view of information sharing - power in
R: So if he's going to leave, you'll get notified, so and so's going to leave from this day to that day, Joe Bloggs is standing in from this day to that day, and that's his contact number. Anybody passes away, and any other information they want to impart to us, you know, this water crisis we've got is all imparted on, on, on the computer. And then obviously we use emails and stuff, er, I mean I use it all the time. There's very...letters still get sent out because you've still got to send out official letters to people...
OR combination (standard analysis)
15:14
03/10/2013


D:\Personal (2)\Psycho 6 (Doctorate) current\Qualitative Analysis\First Interview IPA.mx4 - MAXQDA 10 R140612
Document Browser: Electrical_Superintendent[1]
..communicating - replaced other ways
..restricted view of information sharing - power in
Anybody passes away, and any other information they want to impart to us, you know, this water crisis we've got is all imparted on, on, on the computer. And then obviously we use emails and stuff, er, I mean I use it all the time. There's very...letters still get sent out because you've still got to send out official letters to people...
I: Yeah.
R: ...er, because you've got to have legal documentation, I don't think an email's accepted as a legal document if someone's got to physically sign anything.
I: Yeah.
R: But we also just send it out as an email, so we'll send email out to the people and I communicate all the time with firms all over Africa, all over South Africa and er, with email, you know. That's...
I: And so what, what would you be doing with that communication?
R: Erm, well...
I: To other companies outside of...
R: Well, most of the stuff, it's if something, if something has blown up, like erm, last week we had sub generators blown up, so I had to contact ABB, in Joelberg and say, 'this, this is the unit that's blown up, this is the serial number and I need you to just to give me a price for that,' you know.
I: Yeah.
R: Erm, and basically stuff like that, it's just, it's just to and fro, prices coming in, quotations coming in, they'll send me a quote on er, scan it and send it through as an email, you know, with their heading on it.
I: Yeah.
R: And stuff like that.
I: And do you, how do you find working like that, through email?
..Percieves others feaful of computers
..does huge effort out of
R: Yeah, no, I find it very good, you know. Some people obviously are scared of er, of the computer, you know, but I mean...it doesn't matter, I just, I just use it, you know what I mean. It's a dead easy, you know, way to communicate with people. I communicate on the phone as well, erm.
I: Yeah.
..portecting self with audit trail
..portecting self with audit trail
R: But mostly it's, it's all...I suppose you've got some sort of record that you did communicate with the guy, you know. Like I'm arranging meetings next week for to go to inspect Cooker, so certain things had to be done, you know.
I: Yeah.
..portecting self with audit trail
R: Notify the consultants, speak to them, get times and dates of where to meet them, you know. So I find that fine, I find that great, a great medium, to, to communicate, you know. Plus you've got a record, you know.
OR combination (standard analysis) 1 / 1
15:14
03/10/2013
D:\Personal (2)\Psycho 6 (Doctorate) current\Qualitative Analysis\First Interview IPA.mx4 - MAXQDA 10 R140612
Document Browser: Electrical_Superintendent[1]
..portecting self with audit trail
R: Notify the consultants, speak to them, get times and dates of where to meet them, you know. So I find that fine, I find that great, a great medium, to, to communicate, you know. Plus you've got a record, you know.
I: Yeah.
..Hesitancy to adopt - still using old means
R: Because I always print a hard copy usually...
I: Yeah.
R: ...and I file it.
I: Yeah.
..Hesitancy to adopt - still using old means
R: Erm, I was brought up that way, er, overseas, with the paper trail. The guy with the biggest pile of paper would win the argument at the end of the day, because everybody always forgets, you know.
I: Yeah.
..Hesitancy to adopt - still using old means
..portecting self with audit trail
R: You could talk to somebody, and then they'll forget, then you can say, 'look, there it is, I sent you an email that day.'
I: Yeah.
R: 'And you got it...
I: Yeah.
R: ...'cos I could see you opened it.'
I: Yeah, so you'd put a read receipt on it, kind of thing...
..portecting self with audit trail
R: Yeah, there's a read receipt on them all.
I: ...to get the audit trail.
R: So I can tell it's, it's opened and they've read it.
I: So do you find that, that...what impact does that have on your job using this, the emails...
R: Erm...
I: ...as opposed to having to phone someone up or speak to someone, to use those emails?
OR combination (standard analysis) 1 / 1
15:15
03/10/2013



117 R: Well, I think the thing is, I can do it quite quickly, and if I go into the office in the morning and obviously there's a pile of email, say I come...'cos we finish early, a pile of emails from the day before, then I can just rattle through them. Read the stuff from downtown it it's not pertinent to me, like a town councillor going away, I just read it and delete it if it's irrelevant. But then the other stuff I can, I can handle, and handle it very quickly, and then go out and do what I'm supposed to do out in the field, you know, it just keeps my hands...

118 I: So it frees up your time then.

119 R: It frees up more time, yeah, frees up more time. Then if the boss has got something, erm, and I'll say to him, 'well, have you got it on an email, like...' or even set some minutes for meetings, everything's kept on...So they'll send me the sets of minutes on email, and I can print a hard copy. Erm, but if the boss has got something, I'll just say to him, 'look, don't, don't talk to me about it, just send it, send it to me,' even though he's only two doors along, at least I've got a copy then, you know.

120 I: Yeah. So it gives you security...

121 R: Yeah.

122 I: ...erm, the audit trail and it makes it, things faster...

123 R: Yeah, yeah.

124 I: ...er, at work

125 R: And all our monthly reports er, are done on er, on computer. What I done was, I got the, each section to make up a, the undergrounds and the overhead section, although they don't fall under me, I said to them, 'look, this is what I've made up for my section, just a sheet where you fill in the blanks, and then you can type a story of what you've done,' 'cos they must record what they've done each month...

126 I: Yeah.

127 R: ...any breakdowns, outages, guys off sick, trucks that have broken down, you know, all the man hours. So I made up er, two, two kinda small spreadsheets, erm, they just fill in the boxes and then they write the story. So they've adopted the same thing. So it saves them a lot of time now.

128 I: Yeah.

129 R: Instead of before we had to handwrite it in a big diary, and that had to go to someone else who had to handwrite it to someone else, who had to handwrite it to the boss. So they had to take all the information, make it into one report and send it to the boss. Er, now what they want us to do is although we've got three sections, the undergrounds, overheads and us, erm, the new clerical stuff we've got, we're going to send it to that lady and she's going to compile it into one and send it as an email, and she'll store a hard copy in a file...

130 I: Yeah.

131 R: ...in her office. But I'll need to read it over first to make sure it's right that she's got all the information there.

132 I: Yeah.

133 R: But she'll send it down as an email to the boss.

134 I: So it sounds like it's speeded up quite a lot.

135 R: Yeah, no, it gets speed up, yeah. Erm, there is a lot of paperwork from the point of view that erm, when you're out on site, you've got to take these data sheets with you and they must be filled in, and they must be filled in er, handwritten.

136 I: Yeah.

137 R: And all the job cards, although they're produced electronically, they've all got to be filled in, handwritten and signed, they must be signed at the bottom...

138 I: Yeah.

139 R: ...who's done the job.

140 I: Yeah.

141 R: So that there is a record erm, not to point fingers, but at least you can say, 'well, you overhauled that three weeks ago, how come it's broken down, your signature's on it.' I.e. you're like any other business, like flying aeroplanes, someone's got to sign it to say they done the job.

142 I: Yeah.

143 R: And they replaced X, Y and Z, so there's a record of that kept, and there's a history of what has been done, and what has been replaced, and what the problem was.

144 I: Yeah.

145 R: So we can, we can backtrack, erm.

146 I: And see what's gone on...

147 R: See what's gone on.

148 I: ...'cos then...is that a problem solving kind of...

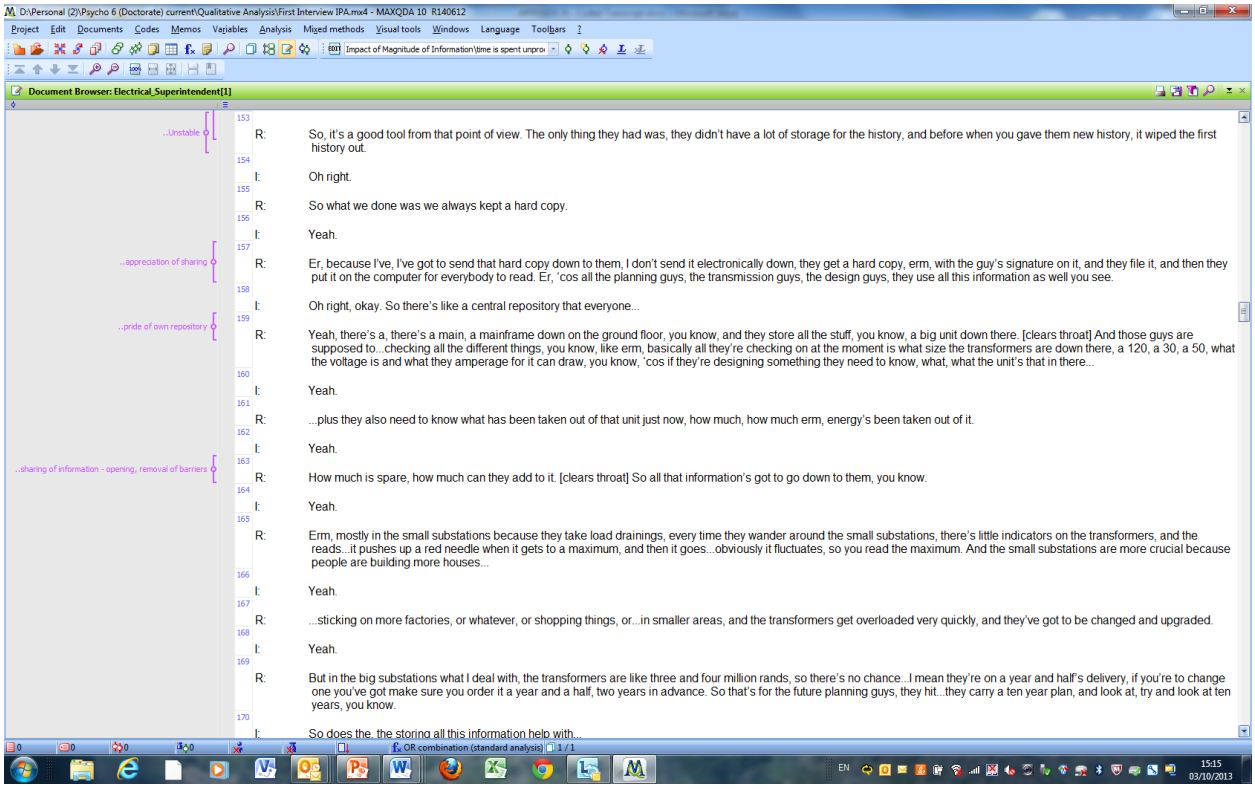
149 R: Erm...

150 I: ...tool then, that you can go back through the history?

151 R: Yes, you can go back and you can say, 'well, you know, what was the problem we had the last time? You know, is this problem there the same, or is it a reoccurrence, or is it something different?'

152 I: Yeah.

153 R: So, it's a good tool from that point of view. The only thing they had was, they didn't have a lot of storage for the history, and before when you gave them new history, it wiped the first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..Unstable
..appreciation of sharing
..pride of own repository
..sharing of information - opening, removal of barriers
153 R: So, it's a good tool from that point of view. The only thing they had was, they didn't have a lot of storage for the history, and before when you gave them new history, it wiped the first history out.
154 I: Oh right.
155 R: So what we done was we always kept a hard copy.
156 I: Yeah.
157 R: Er, because I've, I've got to send that hard copy down to them, I don't send it electronically down, they get a hard copy, erm, with the guy's signature on it, and they file it, and then they put it on the computer for everybody to read. Er, 'cos all the planning guys, the transmission guys, the design guys, they use all this information as well you see.
158 I: Oh right, okay. So there's like a central repository that everyone...
159 R: Yeah, there's a, there's a main, a mainframe down on the ground floor, you know, and they store all the stuff, you know, a big unit down there. [clears throat] And those guys are supposed to...checking all the different things, you know, like erm, basically all they're checking on at the moment is what size the transformers are down there, a 120, a 30, a 50, what the voltage is and what they amperage for it can draw, you know, 'cos if they're designing something they need to know, what, what the unit's that in there...
160 I: Yeah.
161 R: ...plus they also need to know what has been taken out of that unit just now, how much, how much erm, energy's been taken out of it.
162 I: Yeah.
163 R: How much is spare, how much can they add to it. [clears throat] So all that information's got to go down to them, you know.
164 I: Yeah.
165 R: Erm, mostly in the small substations because they take load drainings, every time they wander around the small substations, there's little indicators on the transformers, and the reads...it pushes up a red needle when it gets to a maximum, and then it goes...obviously it fluctuates, so you read the maximum. And the small substations are more crucial because people are building more houses...
166 I: Yeah.
167 R: ...sticking on more factories, or whatever, or shopping things, or...in smaller areas, and the transformers get overloaded very quickly, and they've got to be changed and upgraded.
168 I: Yeah.
169 R: But in the big substations what I deal with, the transformers are like three and four million rands, so there's no chance...I mean they're on a year and half's delivery, if you're to change one you've got make sure you order it a year and a half, two years in advance. So that's for the future planning guys, they hit...they carry a ten year plan, and look at, try and look at ten years, you know.
170 I: So does the, the storing all this information help with...
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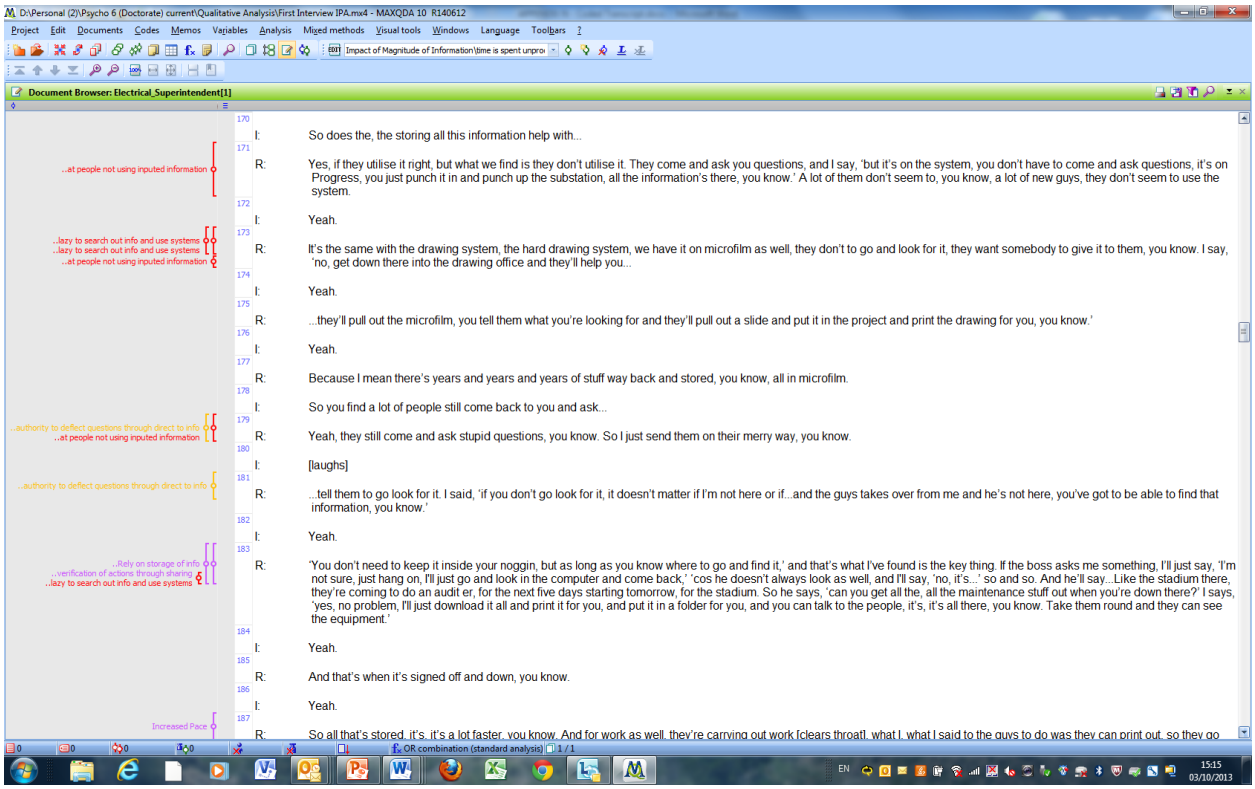
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..at people not using inputed information
..lazy to search out info and use systems
..lazy to search out info and use systems
..at people not using inputed information
..authority to deflect questions through direct to info
..at people not using inputed information
..authority to deflect questions through direct to info
..Rely on storage of info
..verification of actions through sharing
..lazy to search out info and use systems
Increased Pace
170 I: So does the, the storing all this information help with...
171 R: Yes, if they utilise it right, but what we find is they don't utilise it. They come and ask you questions, and I say, 'but it's on the system, you don't have to come and ask questions, it's on Progress, you just punch it in and punch up the substation, all the information's there, you know.' A lot of them don't seem to, you know, a lot of new guys, they don't seem to use the system.
172 I: Yeah.
173 R: It's the same with the drawing system, the hard drawing system, we have it on microfilm as well, they don't to go and look for it, they want somebody to give it to them, you know. I say, 'no, get down there into the drawing office and they'll help you...
174 I: Yeah.
175 R: ...they'll pull out the microfilm, you tell them what you're looking for and they'll pull out a slide and put it in the project and print the drawing for you, you know.'
176 I: Yeah.
177 R: Because I mean there's years and years and years of stuff way back and stored, you know, all in microfilm.
178 I: So you find a lot of people still come back to you and ask...
179 R: Yeah, they still come and ask stupid questions, you know. So I just send them on their merry way, you know.
180 I: [laughs]
181 R: ...tell them to go look for it. I said, 'if you don't go look for it, it doesn't matter if I'm not here or if...and the guys takes over from me and he's not here, you've got to be able to find that information, you know.'
182 I: Yeah.
183 R: 'You don't need to keep it inside your noggin, but as long as you know where to go and find it,' and that's what I've found is the key thing. If the boss asks me something, I'll just say, 'I'm not sure, just hang on, I'll just go and look in the computer and come back,' 'cos he doesn't always look as well, and I'll say, 'no, it's...' so and so. And he'll say...Like the stadium there, they're coming to do an audit er, for the next five days starting tomorrow, for the stadium. So he says, 'can you get all the, all the maintenance stuff out when you're down there?' I says, 'yes, no problem, I'll just download it all and print it for you, and put it in a folder for you, and you can talk to the people, it's, it's all there, you know. Take them round and they can see the equipment.'
184 I: Yeah.
185 R: And that's when it's signed off and down, you know.
186 I: Yeah.
187 R: So all that's stored, it's, it's a lot faster, you know. And for work as well, they're carrying out work [clears throat], what I, what I said to the guys to do was they can print out, so they go
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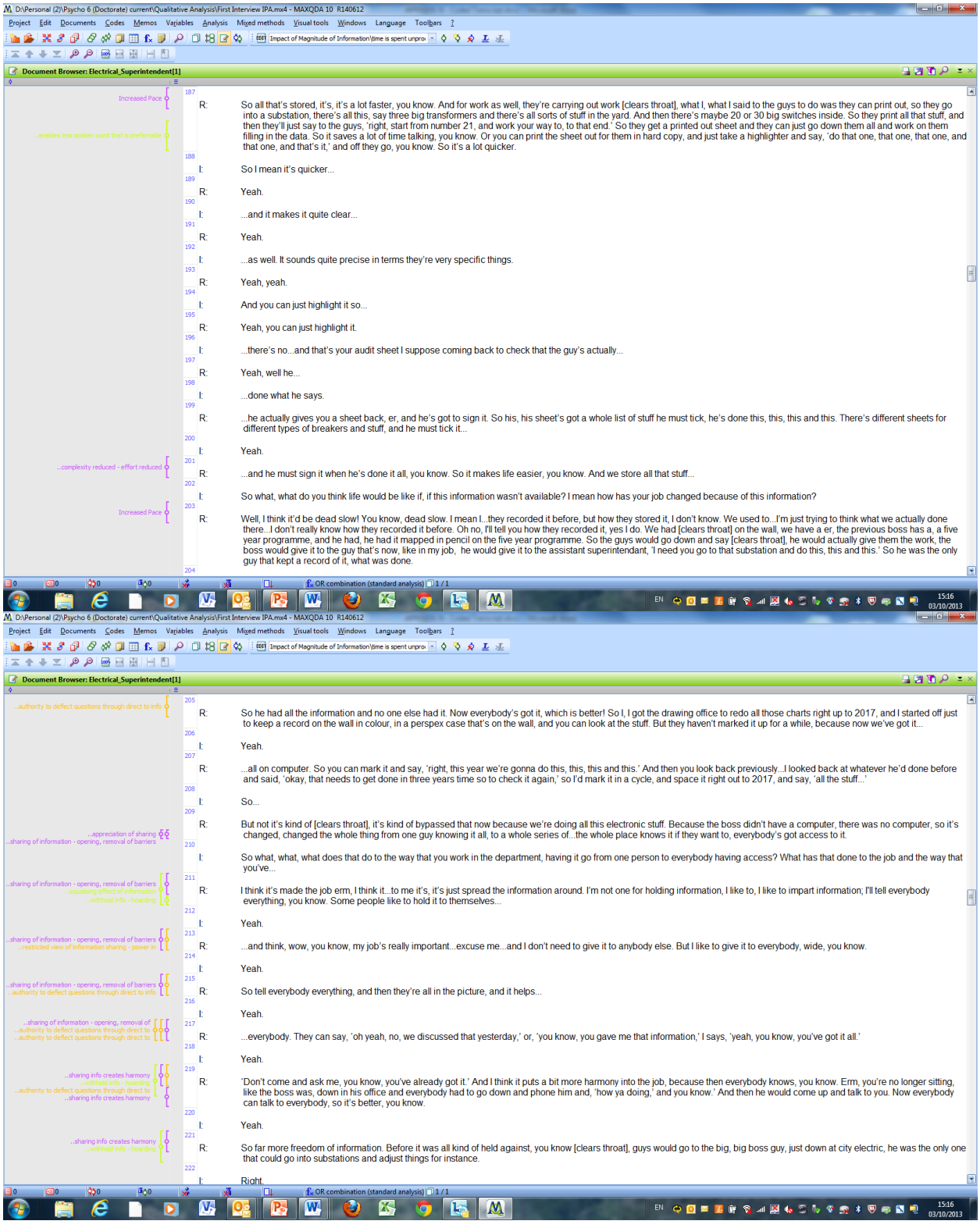
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Increased Pace
...enables less spoken word that is preferable
R: So all that's stored, it's, it's a lot faster, you know. And for work as well, they're carrying out work [clears throat], what I, what I said to the guys to do was they can print out, so they go into a substation, there's all this, say three big transformers and there's all sorts of stuff in the yard. And then there's maybe 20 or 30 big switches inside. So they print all that stuff, and then they'll just say to the guys, 'right, start from number 21, and work your way to, to that end.' So they get a printed out sheet and they can just go down them all and work on them filling in the data. So it saves a lot of time talking, you know. Or you can print the sheet out for them in hard copy, and just take a highlighter and say, 'do that one, that one, that one, and that one, and that's it,' and off they go, you know. So it's a lot quicker.
I: So I mean it's quicker...
R: Yeah.
I: ...and it makes it quite clear...
R: Yeah.
I: ...as well. It sounds quite precise in terms they're very specific things.
R: Yeah, yeah.
I: And you can just highlight it so...
R: Yeah, you can just highlight it.
I: ...there's no...and that's your audit sheet I suppose coming back to check that the guy's actually...
R: Yeah, well he...
I: ...done what he says.
R: ...he actually gives you a sheet back, er, and he's got to sign it. So his, his sheet's got a whole list of stuff he must tick, he's done this, this, this and this. There's different sheets for different types of breakers and stuff, and he must tick it...
I: Yeah.
..complexity reduced - effort reduced
R: ...and he must sign it when he's done it all, you know. So it makes life easier, you know. And we store all that stuff...
I: So what, what do you think life would be like if, if this information wasn't available? I mean how has your job changed because of this information?
Increased Pace
R: Well, I think it'd be dead slow! You know, dead slow. I mean I...they recorded it before, but how they stored it, I don't know. We used to...I'm just trying to think what we actually done there...I don't really know how they recorded it before. Oh no, I'll tell you how they recorded it, yes I do. We had [clears throat] on the wall, we have a er, the previous boss has a, a five year programme, and he had, he had it mapped in pencil on the five year programme. So the guys would go down and say [clears throat], he would actually give them the work, the boss would give it to the guy that's now, like in my job, he would give it to the assistant superintendant, 'I need you go to that substation and do this, this and this.' So he was the only guy that kept a record of it, what was done.
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..authority to deflect questions through direct to info
R: So he had all the information and no one else had it. Now everybody's got it, which is better! So I, I got the drawing office to redo all those charts right up to 2017, and I started off just to keep a record on the wall in colour, in a perspex case that's on the wall, and you can look at the stuff. But they haven't marked it up for a while, because now we've got it...
I: Yeah.
R: ...all on computer. So you can mark it and say, 'right, this year we're gonna do this, this, this and this.' And then you look back previously...I looked back at whatever he'd done before and said, 'okay, that needs to get done in three years time so to check it again,' so I'd mark it in a cycle, and space it right out to 2017, and say, 'all the stuff...'
I: So...
..appreciation of sharing
..sharing of information - opening, removal of barriers
R: But not it's kind of [clears throat], it's kind of bypassed that now because we're doing all this electronic stuff. Because the boss didn't have a computer, there was no computer, so it's changed, changed the whole thing from one guy knowing it all, to a whole series of...the whole place knows it if they want to, everybody's got access to it.
I: So what, what, what does that do to the way that you work in the department, having it go from one person to everybody having access? What has that done to the job and the way that you've...
..sharing of information - opening, removal of barriers
..equalising effect of information
..withhold info - hoarding
R: I think it's made the job erm, I think it...to me it's, it's just spread the information around. I'm not one for holding information, I like to, I like to impart information; I'll tell everybody everything, you know. Some people like to hold it to themselves...
I: Yeah.
..sharing of information - opening, removal of barriers
..restricted view of information sharing - power in
R: ...and think, wow, you know, my job's really important...excuse me...and I don't need to give it to anybody else. But I like to give it to everybody, wide, you know.
I: Yeah.
..sharing of information - opening, removal of barriers
..authority to deflect questions through direct to info
R: So tell everybody everything, and then they're all in the picture, and it helps...
I: Yeah.
..sharing of information - opening, removal of
..authority to deflect questions through direct to
..authority to deflect questions through direct to
R: ...everybody. They can say, 'oh yeah, no, we discussed that yesterday,' or, 'you know, you gave me that information,' I says, 'yeah, you know, you've got it all.'
I: Yeah.
..sharing info creates harmony
..withhold info - hoarding
..authority to deflect questions through direct to
..sharing info creates harmony
R: 'Don't come and ask me, you know, you've already got it.' And I think it puts a bit more harmony into the job, because then everybody knows, you know. Erm, you're no longer sitting, like the boss was, down in his office and everybody had to go down and phone him and, 'how ya doing,' and you know.' And then he would come up and talk to you. Now everybody can talk to everybody, so it's better, you know.
I: Yeah.
..sharing info creates harmony
..withhold info - hoarding
R: So far more freedom of information. Before it was all kind of held against, you know [clears throat], guys would go to the big, big boss guy, just down at city electric, he was the only one that could go into substations and adjust things for instance.
I: Right.
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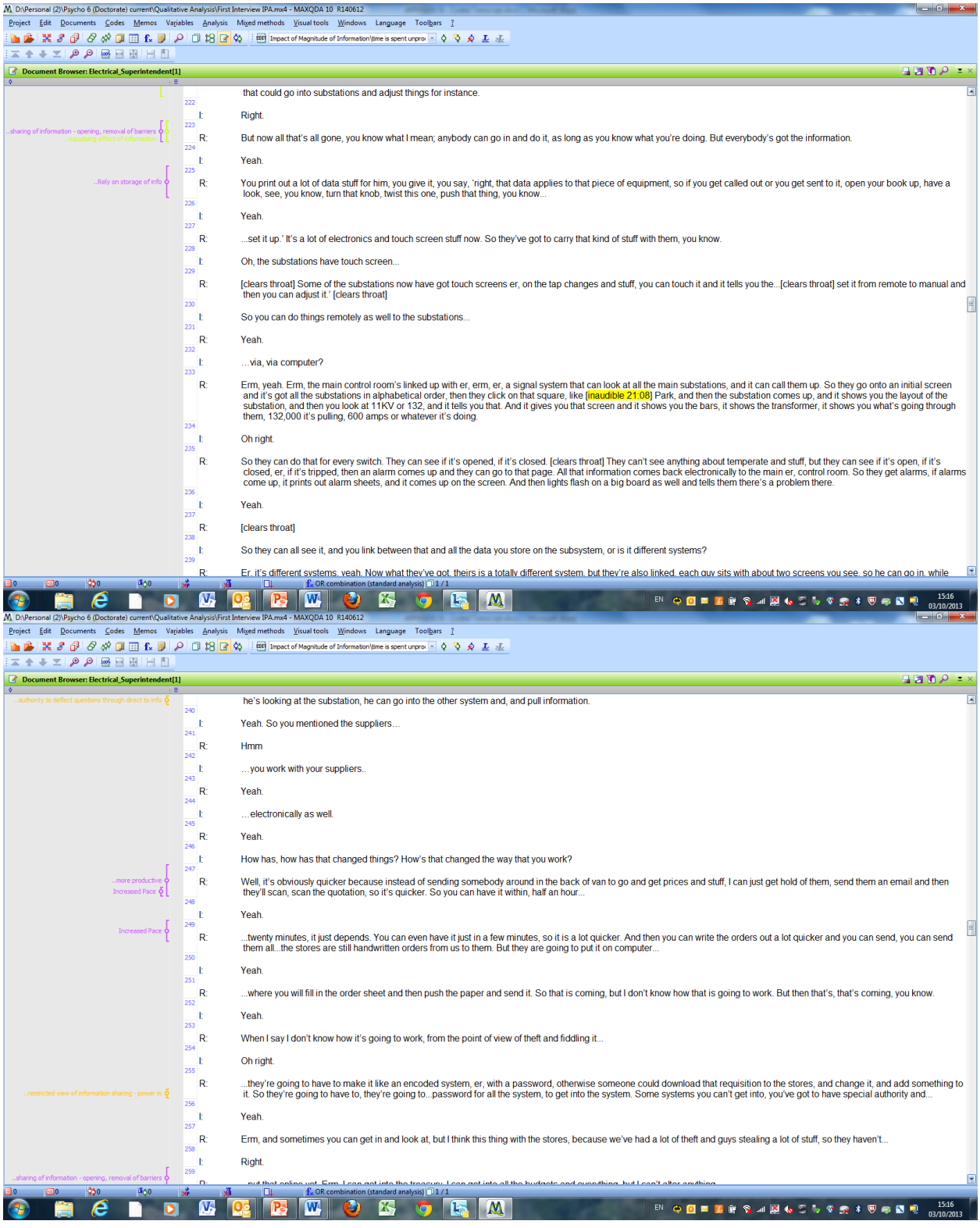
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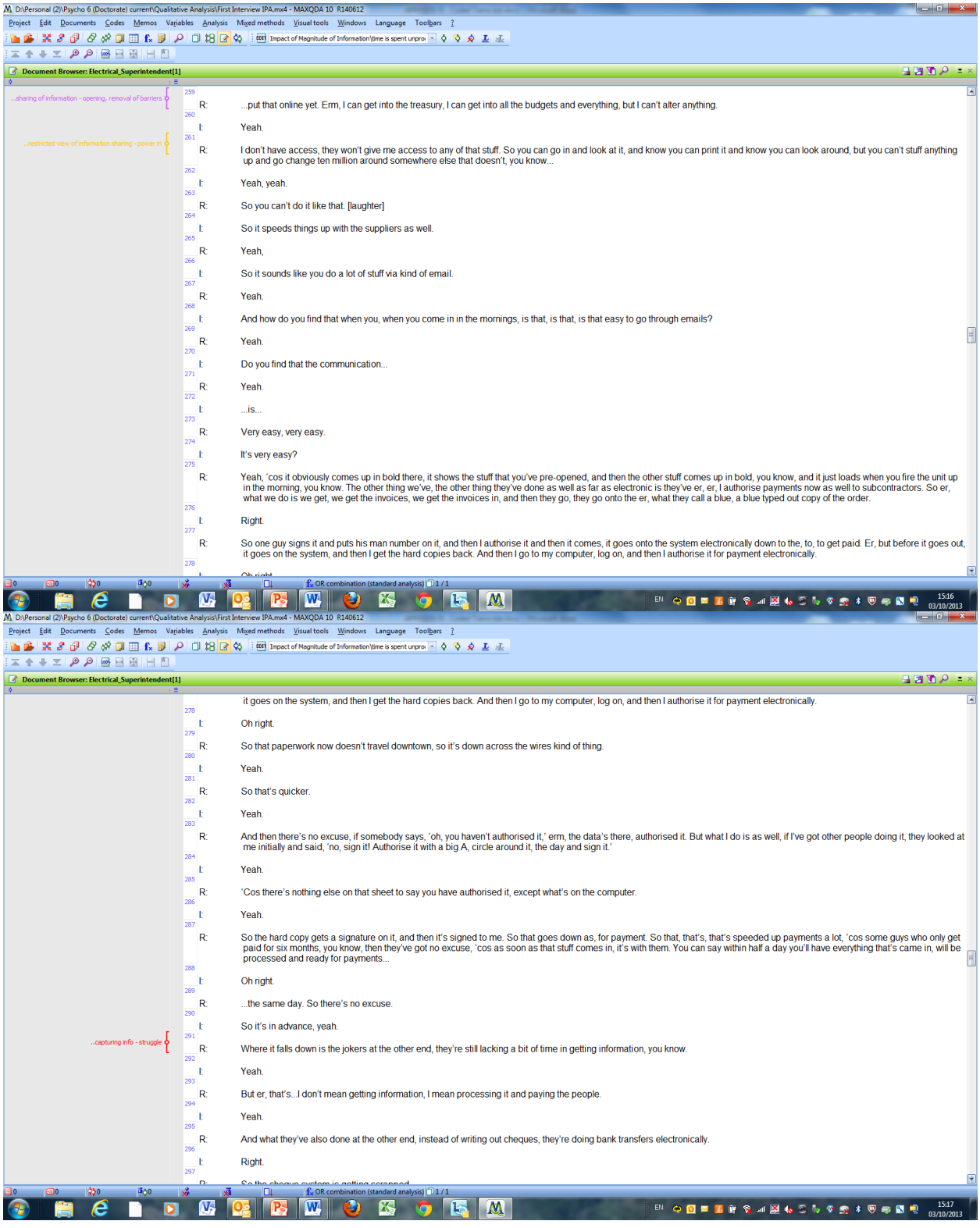
...equalising effect of information
...Rely on storage of info
...authority to deflect questions through direct to info
...more productive
Increased Pace
Increased Pace
...restricted view of information sharing - power in
...sharing of information - opening, removal of barriers
that could go into substations and adjust things for instance.
I: Right.
R: But now all that's all gone, you know what I mean; anybody can go in and do it, as long as you know what you're doing. But everybody's got the information.
I: Yeah.
R: You print out a lot of data stuff for him, you give it, you say, 'right, that data applies to that piece of equipment, so if you get called out or you get sent to it, open your book up, have a look, see, you know, turn that knob, twist this one, push that thing, you know...
I: Yeah.
R: ...set it up.' It's a lot of electronics and touch screen stuff now. So they've got to carry that kind of stuff with them, you know.
I: Oh, the substations have touch screen...
R: [clears throat] Some of the substations now have got touch screens er, on the tap changes and stuff, you can touch it and it tells you the...[clears throat] set it from remote to manual and then you can adjust it.' [clears throat]
I: So you can do things remotely as well to the substations...
R: Yeah.
I: ...via, via computer?
R: Erm, yeah. Erm, the main control room's linked up with er, erm, er, a signal system that can look at all the main substations, and it can call them up. So they go onto an initial screen and it's got all the substations in alphabetical order, then they click on that square, like [inaudible 21:08] Park, and then the substation comes up, and it shows you the layout of the substation, and then you look at 11KV or 132, and it tells you that. And it gives you that screen and it shows you the bars, it shows the transformer, it shows you what's going through them, 132,000 it's pulling, 600 amps or whatever it's doing.
I: Oh right.
R: So they can do that for every switch. They can see if it's opened, if it's closed. [clears throat] They can't see anything about temperate and stuff, but they can see if it's open, if it's closed, er, if it's tripped, then an alarm comes up and they can go to that page. All that information comes back electronically to the main er, control room. So they get alarms, if alarms come up, it prints out alarm sheets, and it comes up on the screen. And then lights flash on a big board as well and tells them there's a problem there.
I: Yeah.
R: [clears throat]
I: So they can all see it, and you link between that and all the data you store on the subsystem, or is it different systems?
R: Er, it's different systems, yeah. Now what they've got, theirs is a totally different system, but they're also linked, each guy sits with about two screens you see, so he can go in, while
he's looking at the substation, he can go into the other system and, and pull information.
I: Yeah. So you mentioned the suppliers...
R: Hmm
I: ...you work with your suppliers..
R: Yeah.
I: ...electronically as well.
R: Yeah.
I: How has, how has that changed things? How's that changed the way that you work?
R: Well, it's obviously quicker because instead of sending somebody around in the back of van to go and get prices and stuff, I can just get hold of them, send them an email and then they'll scan, scan the quotation, so it's quicker. So you can have it within, half an hour...
I: Yeah.
R: ...twenty minutes, it just depends. You can even have it just in a few minutes, so it is a lot quicker. And then you can write the orders out a lot quicker and you can send, you can send them all...the stores are still handwritten orders from us to them. But they are going to put it on computer...
I: Yeah.
R: ...where you will fill in the order sheet and then push the paper and send it. So that is coming, but I don't know how that is going to work. But then that's, that's coming, you know.
I: Yeah.
R: When I say I don't know how it's going to work, from the point of view of theft and fiddling it...
I: Oh right.
R: ...they're going to have to make it like an encoded system, er, with a password, otherwise someone could download that requisition to the stores, and change it, and add something to it. So they're going to have to, they're going to...password for all the system, to get into the system. Some systems you can't get into, you've got to have special authority and...
I: Yeah.
R: Erm, and sometimes you can get in and look at, but I think this thing with the stores, because we've had a lot of theft and guys stealing a lot of stuff, so they haven't...
I: Right.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..sharing of information - opening, removal of barriers
..restricted view of information sharing - power in
..capturing info - struggle
259 R: ...put that online yet. Erm, I can get into the treasury, I can get into all the budgets and everything, but I can't alter anything.
260 I: Yeah.
261 R: I don't have access, they won't give me access to any of that stuff. So you can go in and look at it, and know you can print it and know you can look around, but you can't stuff anything up and go change ten million around somewhere else that doesn't, you know...
262 I: Yeah, yeah.
263 R: So you can't do it like that. [laughter]
264 I: So it speeds things up with the suppliers as well.
265 R: Yeah,
266 I: So it sounds like you do a lot of stuff via kind of email.
267 R: Yeah.
268 I: And how do you find that when you, when you come in in the mornings, is that, is that, is that easy to go through emails?
269 R: Yeah.
270 I: Do you find that the communication...
271 R: Yeah.
272 I: ...is...
273 R: Very easy, very easy.
274 I: It's very easy?
275 R: Yeah, 'cos it obviously comes up in bold there, it shows the stuff that you've pre-opened, and then the other stuff comes up in bold, you know, and it just loads when you fire the unit up in the morning, you know. The other thing we've, the other thing they've done as well as far as electronic is they've er, er, I authorise payments now as well to subcontractors. So er, what we do is we get, we get the invoices, we get the invoices in, and then they go, they go onto the er, what they call a blue, a blue typed out copy of the order.
276 I: Right.
277 R: So one guy signs it and puts his man number on it, and then I authorise it and then it comes, it goes onto the system electronically down to the, to, to get paid. Er, but before it goes out, it goes on the system, and then I get the hard copies back. And then I go to my computer, log on, and then I authorise it for payment electronically.
278 I: Oh right.
279 R: So that paperwork now doesn't travel downtown, so it's down across the wires kind of thing.
280 I: Yeah.
281 R: So that's quicker.
282 I: Yeah.
283 R: And then there's no excuse, if somebody says, 'oh, you haven't authorised it,' erm, the data's there, authorised it. But what I do is as well, if I've got other people doing it, they looked at me initially and said, 'no, sign it! Authorise it with a big A, circle around it, the day and sign it.'
284 I: Yeah.
285 R: 'Cos there's nothing else on that sheet to say you have authorised it, except what's on the computer.
286 I: Yeah.
287 R: So the hard copy gets a signature on it, and then it's signed to me. So that goes down as, for payment. So that, that's, that's speeded up payments a lot, 'cos some guys who only get paid for six months, you know, then they've got no excuse, 'cos as soon as that stuff comes in, it's with them. You can say within half a day you'll have everything that's came in, will be processed and ready for payments...
288 I: Oh right.
289 R: ...the same day. So there's no excuse.
290 I: So it's in advance, yeah.
291 R: Where it falls down is the jokers at the other end, they're still lacking a bit of time in getting information, you know.
292 I: Yeah.
293 R: But er, that's...I don't mean getting information, I mean processing it and paying the people.
294 I: Yeah.
295 R: And what they've also done at the other end, instead of writing out cheques, they're doing bank transfers electronically.
296 I: Right.
297 R: So the cheque system is getting scrapped.
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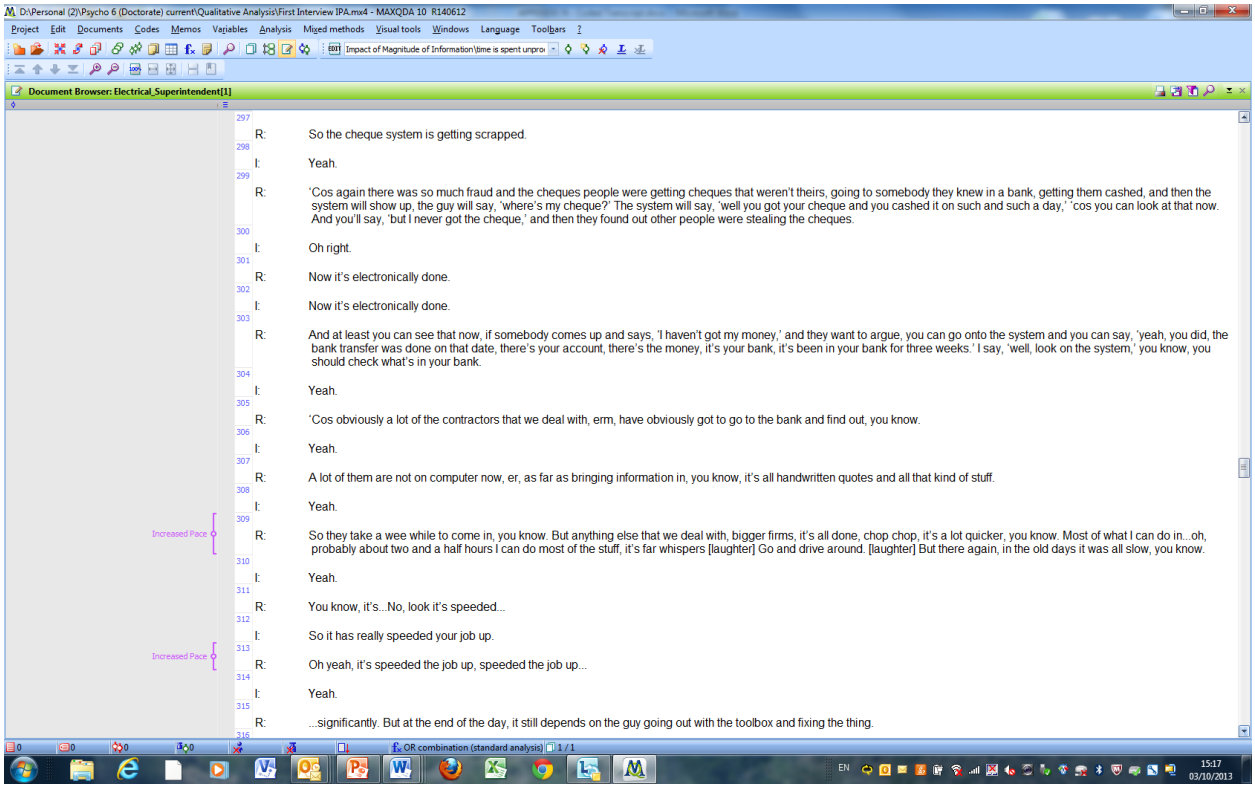
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297 R: So the cheque system is getting scrapped.
298 I: Yeah.
299 R: 'Cos again there was so much fraud and the cheques people were getting cheques that weren't theirs, going to somebody they knew in a bank, getting them cashed, and then the system will show up, the guy will say, 'where's my cheque?' The system will say, 'well you got your cheque and you cashed it on such and such a day,' 'cos you can look at that now. And you'll say, 'but I never got the cheque,' and then they found out other people were stealing the cheques.
300 I: Oh right.
301 R: Now it's electronically done.
302 I: Now it's electronically done.
303 R: And at least you can see that now, if somebody comes up and says, 'I haven't got my money,' and they want to argue, you can go onto the system and you can say, 'yeah, you did, the bank transfer was done on that date, there's your account, there's the money, it's your bank, it's been in your bank for three weeks.' I say, 'well, look on the system,' you know, you should check what's in your bank.
304 I: Yeah.
305 R: 'Cos obviously a lot of the contractors that we deal with, erm, have obviously got to go to the bank and find out, you know.
306 I: Yeah.
307 R: A lot of them are not on computer now, er, as far as bringing information in, you know, it's all handwritten quotes and all that kind of stuff.
308 I: Yeah.
309 Increased Pace
R: So they take a wee while to come in, you know. But anything else that we deal with, bigger firms, it's all done, chop chop, it's a lot quicker, you know. Most of what I can do in...oh, probably about two and a half hours I can do most of the stuff, it's far whispers [laughter] Go and drive around. [laughter] But there again, in the old days it was all slow, you know.
310 I: Yeah.
311 R: You know, it's...No, look it's speeded...
312 I: So it has really speeded your job up.
313 Increased Pace
R: Oh yeah, it's speeded the job up, speeded the job up...
314 I: Yeah.
315 R: ...significantly. But at the end of the day, it still depends on the guy going out with the toolbox and fixing the thing.
316
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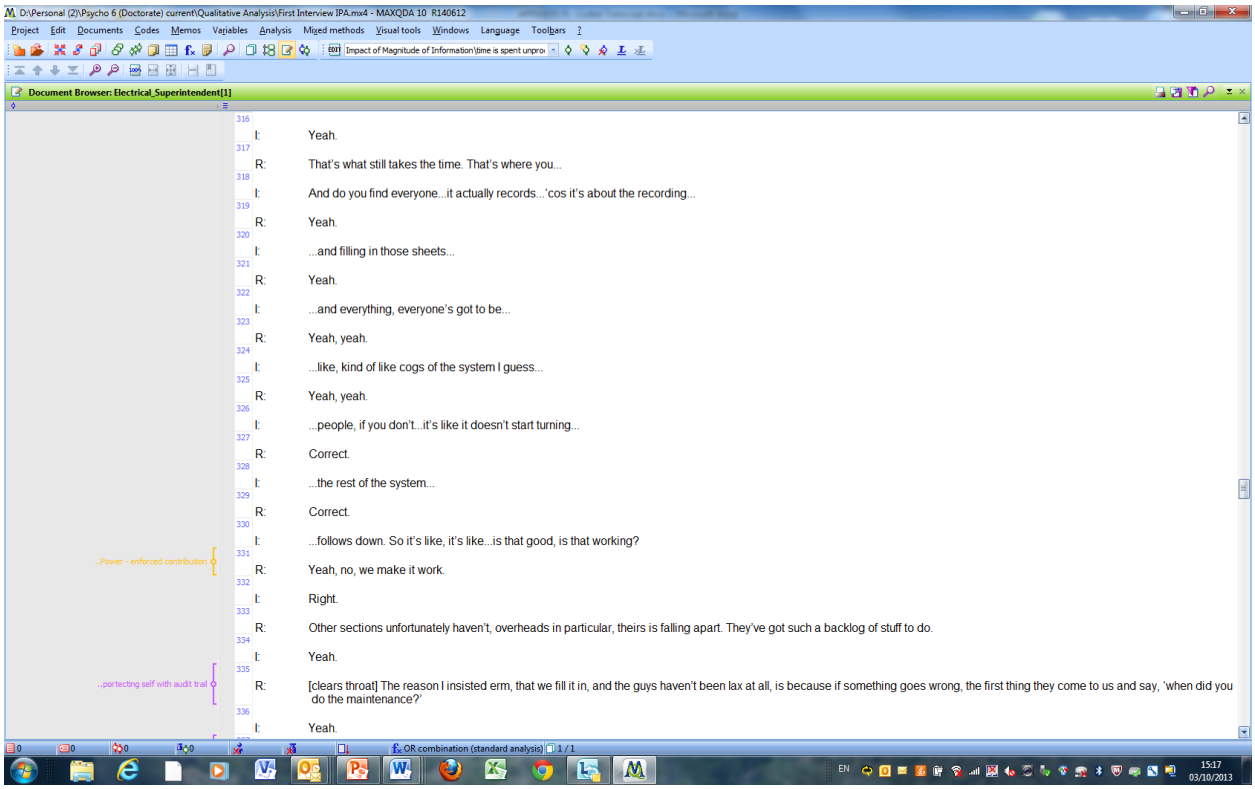
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316 I: Yeah.
317 R: That's what still takes the time. That's where you...
318 I: And do you find everyone...it actually records...'cos it's about the recording...
319 R: Yeah.
320 I: ...and filling in those sheets...
321 R: Yeah.
322 I: ...and everything, everyone's got to be...
323 R: Yeah, yeah.
324 I: ...like, kind of like cogs of the system I guess...
325 R: Yeah, yeah.
326 I: ...people, if you don't...it's like it doesn't start turning...
327 R: Correct.
328 I: ...the rest of the system...
329 R: Correct.
330 I: ...follows down. So it's like, it's like...is that good, is that working?
331 ..Power - enforced contribution
R: Yeah, no, we make it work.
332 I: Right.
333 R: Other sections unfortunately haven't, overheads in particular, theirs is falling apart. They've got such a backlog of stuff to do.
334 I: Yeah.
335 ..protecting self with audit trail
R: [clears throat] The reason I insisted erm, that we fill it in, and the guys haven't been lax at all, is because if something goes wrong, the first thing they come to us and say, 'when did you do the maintenance?'
336 I: Yeah.
OR combination (standard analysis)
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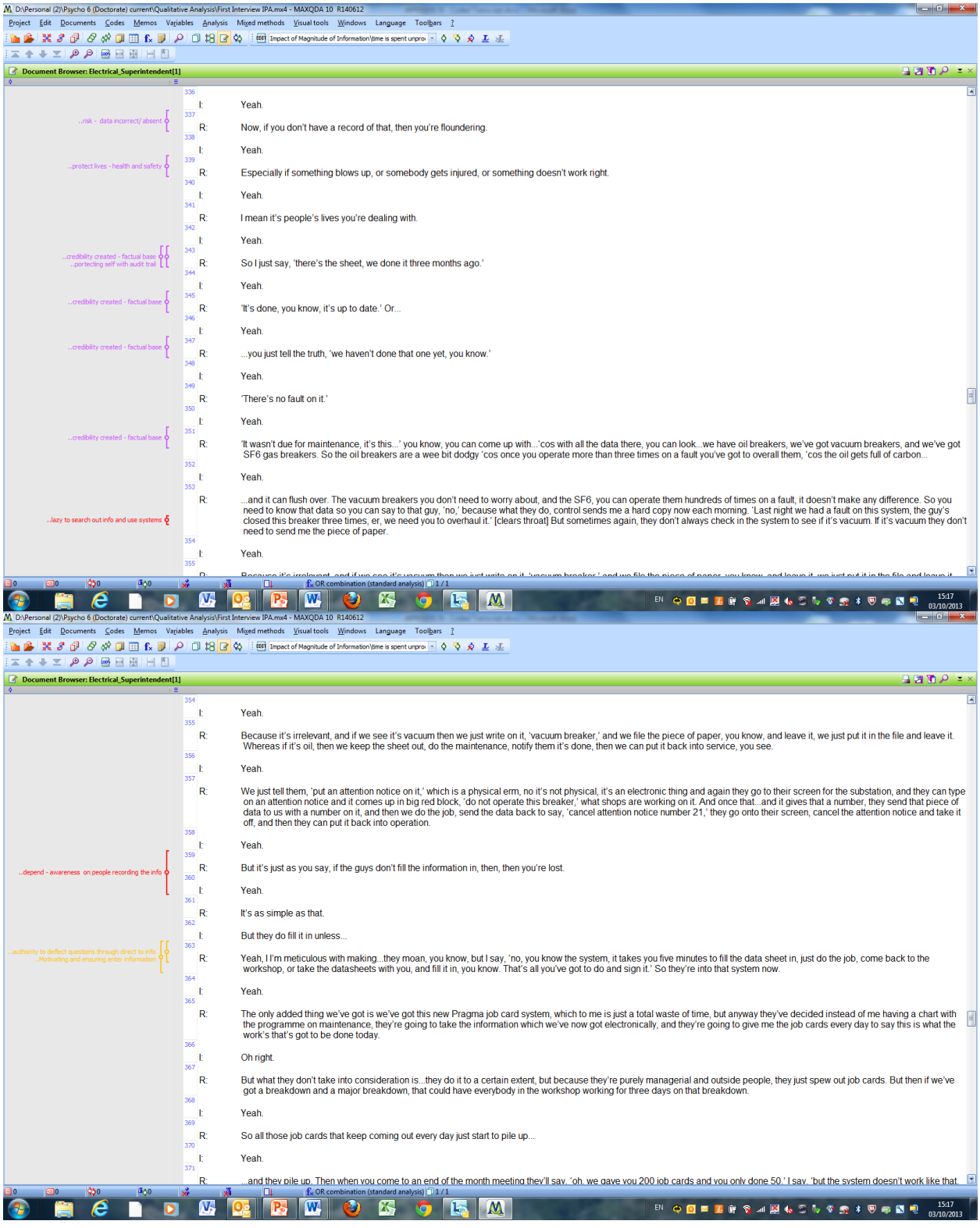
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..risk - data incorrect/ absent
..protect lives - health and safety
..credibility created - factual base
..portecting self with audit trail
..credibility created - factual base
..credibility created - factual base
..credibility created - factual base
..lazy to search out info and use systems
I: Yeah.
R: Now, if you don't have a record of that, then you're floundering.
I: Yeah.
R: Especially if something blows up, or somebody gets injured, or something doesn't work right.
I: Yeah.
R: I mean it's people's lives you're dealing with.
I: Yeah.
R: So I just say, 'there's the sheet, we done it three months ago.'
I: Yeah.
R: 'It's done, you know, it's up to date.' Or...
I: Yeah.
R: ...you just tell the truth, 'we haven't done that one yet, you know.'
I: Yeah.
R: 'There's no fault on it.'
I: Yeah.
R: 'It wasn't due for maintenance, it's this...' you know, you can come up with...'cos with all the data there, you can look...we have oil breakers, we've got vacuum breakers, and we've got SF6 gas breakers. So the oil breakers are a wee bit dodgy 'cos once you operate more than three times on a fault you've got to overall them, 'cos the oil gets full of carbon...
I: Yeah.
R: ...and it can flush over. The vacuum breakers you don't need to worry about, and the SF6, you can operate them hundreds of times on a fault, it doesn't make any difference. So you need to know that data so you can say to that guy, 'no,' because what they do, control sends me a hard copy now each morning. 'Last night we had a fault on this system, the guy's closed this breaker three times, er, we need you to overhaul it.' [clears throat] But sometimes again, they don't always check in the system to see if it's vacuum. If it's vacuum they don't need to send me the piece of paper.
I: Yeah.
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..depend - awareness on people recording the info
..authority to deflect questions through direct to info
..Motivating and ensuring enter information
I: Yeah.
R: Because it's irrelevant, and if we see it's vacuum then we just write on it, 'vacuum breaker,' and we file the piece of paper, you know, and leave it, we just put it in the file and leave it. Whereas if it's oil, then we keep the sheet out, do the maintenance, notify them it's done, then we can put it back into service, you see.
I: Yeah.
R: We just tell them, 'put an attention notice on it,' which is a physical erm, no it's not physical, it's an electronic thing and again they go to their screen for the substation, and they can type on an attention notice and it comes up in big red block, 'do not operate this breaker,' what shops are working on it. And once that...and it gives that a number, they send that piece of data to us with a number on it, and then we do the job, send the data back to say, 'cancel attention notice number 21,' they go onto their screen, cancel the attention notice and take it off, and then they can put it back into operation.
I: Yeah.
R: But it's just as you say, if the guys don't fill the information in, then, then you're lost.
I: Yeah.
R: It's as simple as that.
I: But they do fill it in unless...
R: Yeah, I I'm meticulous with making...they moan, you know, but I say, 'no, you know the system, it takes you five minutes to fill the data sheet in, just do the job, come back to the workshop, or take the datasheets with you, and fill it in, you know. That's all you've got to do and sign it.' So they're into that system now.
I: Yeah.
R: The only added thing we've got is we've got this new Pragma job card system, which to me is just a total waste of time, but anyway they've decided instead of me having a chart with the programme on maintenance, they're going to take the information which we've now got electronically, and they're going to give me the job cards every day to say this is what the work's that's got to be done today.
I: Oh right.
R: But what they don't take into consideration is...they do it to a certain extent, but because they're purely managerial and outside people, they just spew out job cards. But then if we've got a breakdown and a major breakdown, that could have everybody in the workshop working for three days on that breakdown.
I: Yeah.
R: So all those job cards that keep coming out every day just start to pile up...
I: Yeah.
R: ...and they pile up. Then when you come to an end of the month meeting they'll say, 'oh, we gave you 200 job cards and you only done 50.' I say, 'but the system doesn't work like that
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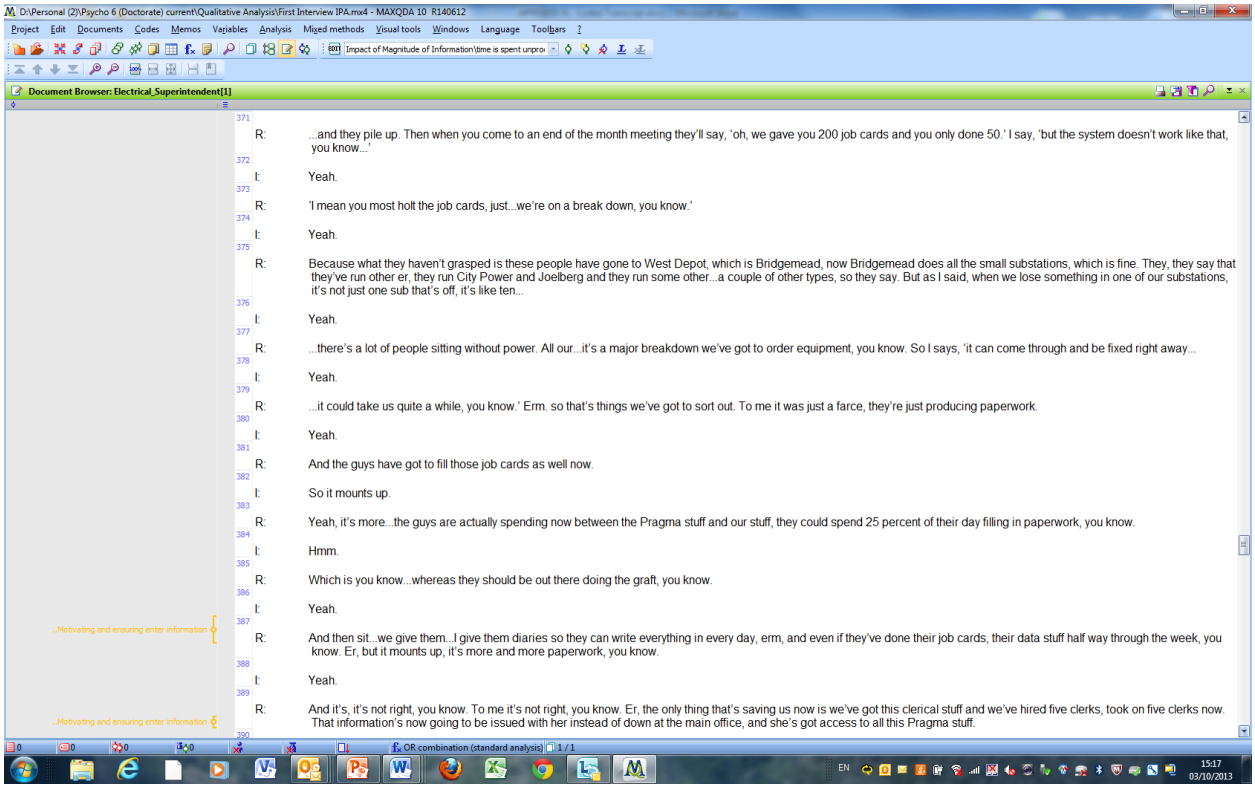
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371 R: ...and they pile up. Then when you come to an end of the month meeting they'll say, 'oh, we gave you 200 job cards and you only done 50.' I say, 'but the system doesn't work like that, you know...'
372 I: Yeah.
373 R: 'I mean you most holt the job cards, just...we're on a break down, you know.'
374 I: Yeah.
375 R: Because what they haven't grasped is these people have gone to West Depot, which is Bridgemead, now Bridgemead does all the small substations, which is fine. They, they say that they've run other er, they run City Power and Joelberg and they run some other...a couple of other types, so they say. But as I said, when we lose something in one of our substations, it's not just one sub that's off, it's like ten...
376 I: Yeah.
377 R: ...there's a lot of people sitting without power. All our...it's a major breakdown we've got to order equipment, you know. So I says, 'it can come through and be fixed right away...
378 I: Yeah.
379 R: ...it could take us quite a while, you know.' Erm. so that's things we've got to sort out. To me it was just a farce, they're just producing paperwork.
380 I: Yeah.
381 R: And the guys have got to fill those job cards as well now.
382 I: So it mounts up.
383 R: Yeah, it's more...the guys are actually spending now between the Pragma stuff and our stuff, they could spend 25 percent of their day filling in paperwork, you know.
384 I: Hmm.
385 R: Which is you know...whereas they should be out there doing the graft, you know.
386 I: Yeah.
387 ..Motivating and ensuring enter information R: And then sit...we give them...I give them diaries so they can write everything in every day, erm, and even if they've done their job cards, their data stuff half way through the week, you know. Er, but it mounts up, it's more and more paperwork, you know.
388 I: Yeah.
389 ..Motivating and ensuring enter information R: And it's, it's not right, you know. To me it's not right, you know. Er, the only thing that's saving us now is we've got this clerical stuff and we've hired five clerks, took on five clerks now. That information's now going to be issued with her instead of down at the main office, and she's got access to all this Pragma stuff.
390
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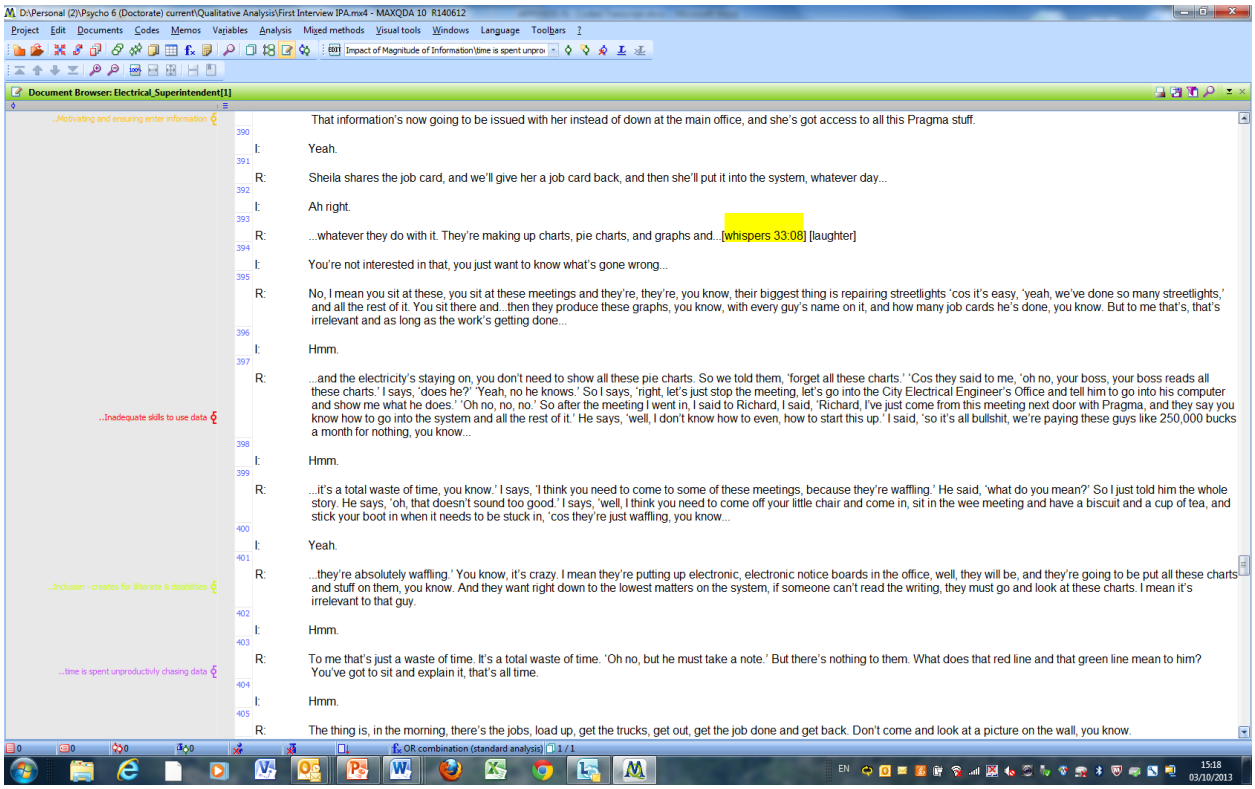
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..Motivating and ensuring enter information That information's now going to be issued with her instead of down at the main office, and she's got access to all this Pragma stuff.
390 I: Yeah.
391 R: Sheila shares the job card, and we'll give her a job card back, and then she'll put it into the system, whatever day...
392 I: Ah right.
393 R: ...whatever they do with it. They're making up charts, pie charts, and graphs and...[whispers 33:08] [laughter]
394 I: You're not interested in that, you just want to know what's gone wrong...
395 R: No, I mean you sit at these, you sit at these meetings and they're, they're, you know, their biggest thing is repairing streetlights 'cos it's easy, 'yeah, we've done so many streetlights,' and all the rest of it. You sit there and...then they produce these graphs, you know, with every guy's name on it, and how many job cards he's done, you know. But to me that's, that's irrelevant and as long as the work's getting done...
396 I: Hmm.
397 ..Inadequate skills to use data R: ...and the electricity's staying on, you don't need to show all these pie charts. So we told them, 'forget all these charts.' 'Cos they said to me, 'oh no, your boss, your boss reads all these charts.' I says, 'does he?' 'Yeah, no he knows.' So I says, 'right, let's just stop the meeting, let's go into the City Electrical Engineer's Office and tell him to go into his computer and show me what he does.' 'Oh no, no, no.' So after the meeting I went in, I said to Richard, I said, 'Richard, I've just come from this meeting next door with Pragma, and they say you know how to go into the system and all the rest of it.' He says, 'well, I don't know how to even, how to start this up.' I said, 'so it's all bullshit, we're paying these guys like 250,000 bucks a month for nothing, you know...
398 I: Hmm.
399 R: ...it's a total waste of time, you know.' I says, 'I think you need to come to some of these meetings, because they're waffling.' He said, 'what do you mean?' So I just told him the whole story. He says, 'oh, that doesn't sound too good.' I says, 'well, I think you need to come off your little chair and come in, sit in the wee meeting and have a biscuit and a cup of tea, and stick your boot in when it needs to be stuck in, 'cos they're just waffling, you know...
400 I: Yeah.
401 ..Inclusion - creates for illiterate & disabilities R: ...they're absolutely waffling.' You know, it's crazy. I mean they're putting up electronic, electronic notice boards in the office, well, they will be, and they're going to be put all these charts and stuff on them, you know. And they want right down to the lowest matters on the system, if someone can't read the writing, they must go and look at these charts. I mean it's irrelevant to that guy.
402 I: Hmm.
403 ..time is spent unproductivly chasing data R: To me that's just a waste of time. It's a total waste of time. 'Oh no, but he must take a note.' But there's nothing to them. What does that red line and that green line mean to him? You've got to sit and explain it, that's all time.
404 I: Hmm.
405 R: The thing is, in the morning, there's the jobs, load up, get the trucks, get out, get the job done and get back. Don't come and look at a picture on the wall, you know.
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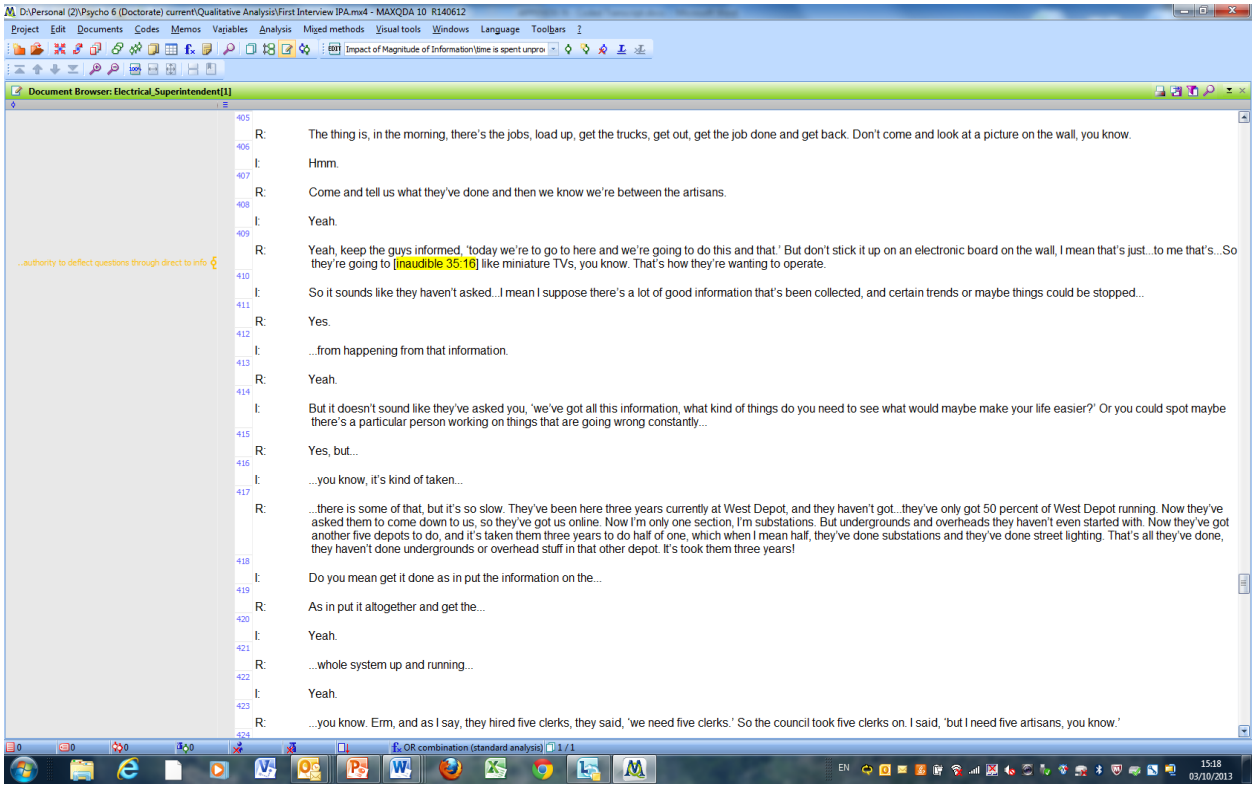
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405 R: The thing is, in the morning, there's the jobs, load up, get the trucks, get out, get the job done and get back. Don't come and look at a picture on the wall, you know.
406 I: Hmm.
407 R: Come and tell us what they've done and then we know we're between the artisans.
408 I: Yeah.
409 R: Yeah, keep the guys informed, 'today we're to go to here and we're going to do this and that.' But don't stick it up on an electronic board on the wall, I mean that's just...to me that's...So they're going to [inaudible 35:16] like miniature TVs, you know. That's how they're wanting to operate.
410 I: So it sounds like they haven't asked...I mean I suppose there's a lot of good information that's been collected, and certain trends or maybe things could be stopped...
411 R: Yes.
412 I: ...from happening from that information.
413 R: Yeah.
414 I: But it doesn't sound like they've asked you, 'we've got all this information, what kind of things do you need to see what would maybe make your life easier?' Or you could spot maybe there's a particular person working on things that are going wrong constantly...
415 R: Yes, but...
416 I: ...you know, it's kind of taken...
417 R: ...there is some of that, but it's so slow. They've been here three years currently at West Depot, and they haven't got...they've only got 50 percent of West Depot running. Now they've asked them to come down to us, so they've got us online. Now I'm only one section, I'm substations. But undergrounds and overheads they haven't even started with. Now they've got another five depots to do, and it's taken them three years to do half of one, which when I mean half, they've done substations and they've done street lighting. That's all they've done, they haven't done undergrounds or overhead stuff in that other depot. It's took them three years!
418 I: Do you mean get it done as in put the information on the...
419 R: As in put it altogether and get the...
420 I: Yeah.
421 R: ...whole system up and running...
422 I: Yeah.
423 R: ...you know. Erm, and as I say, they hired five clerks, they said, 'we need five clerks.' So the council took five clerks on. I said, 'but I need five artisans, you know.'
424
...authority to deflect questions through direct to info...
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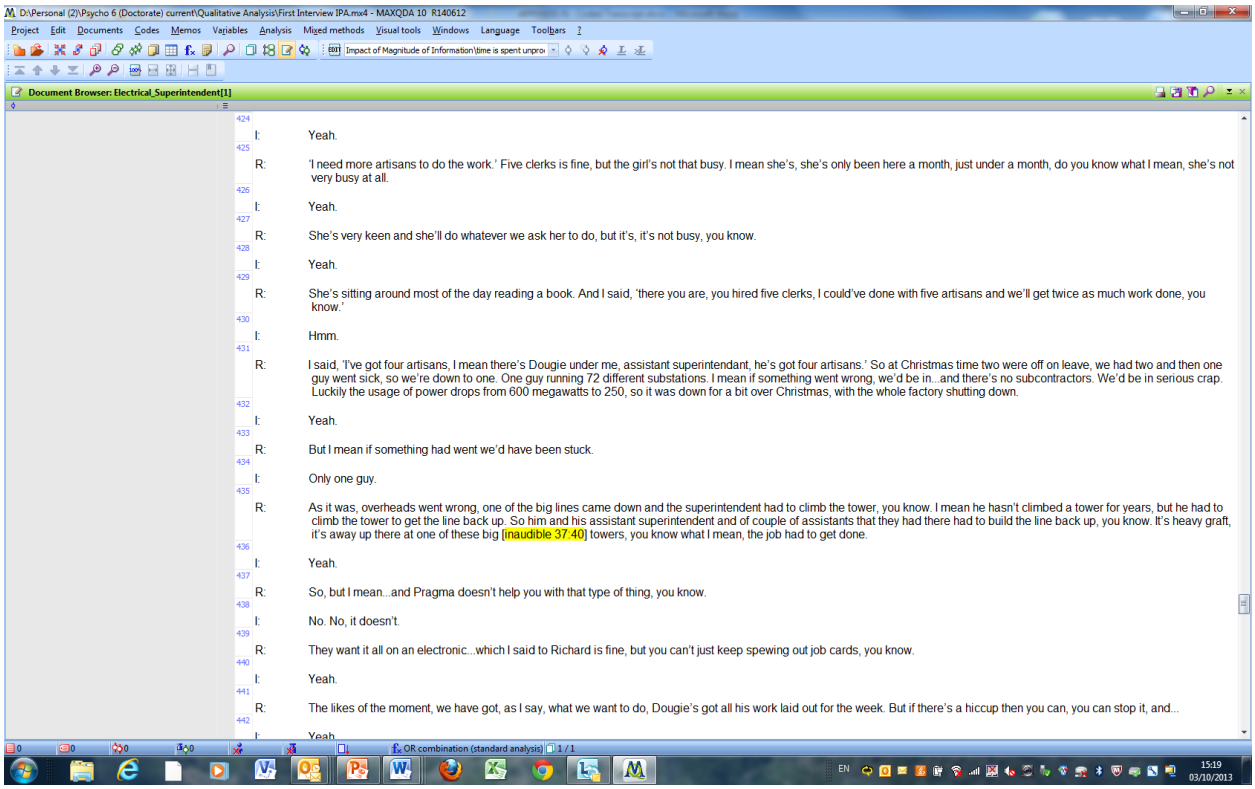
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424 I: Yeah.
425 R: 'I need more artisans to do the work.' Five clerks is fine, but the girl's not that busy. I mean she's, she's only been here a month, just under a month, do you know what I mean, she's not very busy at all.
426 I: Yeah.
427 R: She's very keen and she'll do whatever we ask her to do, but it's, it's not busy, you know.
428 I: Yeah.
429 R: She's sitting around most of the day reading a book. And I said, 'there you are, you hired five clerks, I could've done with five artisans and we'll get twice as much work done, you know.'
430 I: Hmm.
431 R: I said, 'I've got four artisans, I mean there's Dougie under me, assistant superintendant, he's got four artisans.' So at Christmas time two were off on leave, we had two and then one guy went sick, so we're down to one. One guy running 72 different substations. I mean if something went wrong, we'd be in...and there's no subcontractors. We'd be in serious crap. Luckily the usage of power drops from 600 megawatts to 250, so it was down for a bit over Christmas, with the whole factory shutting down.
432 I: Yeah.
433 R: But I mean if something had went we'd have been stuck.
434 I: Only one guy.
435 R: As it was, overheads went wrong, one of the big lines came down and the superintendent had to climb the tower, you know. I mean he hasn't climbed a tower for years, but he had to climb the tower to get the line back up. So him and his assistant superintendent and of couple of assistants that they had there had to build the line back up, you know. It's heavy graft, it's away up there at one of these big [inaudible 37:40] towers, you know what I mean, the job had to get done.
436 I: Yeah.
437 R: So, but I mean...and Pragma doesn't help you with that type of thing, you know.
438 I: No. No, it doesn't.
439 R: They want it all on an electronic...which I said to Richard is fine, but you can't just keep spewing out job cards, you know.
440 I: Yeah.
441 R: The likes of the moment, we have got, as I say, what we want to do, Dougie's got all his work laid out for the week. But if there's a hiccup then you can, you can stop it, and...
442 I: Yeah.
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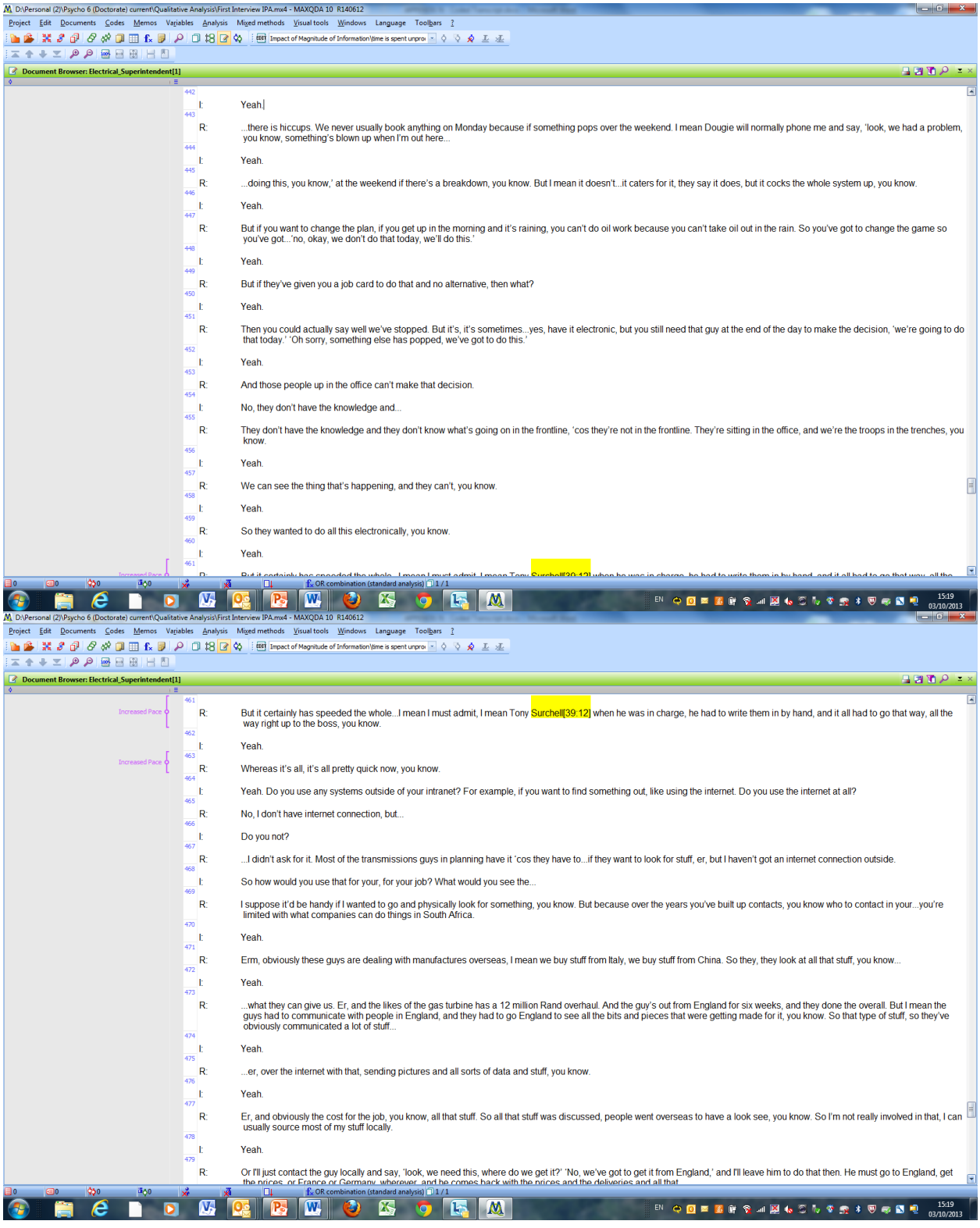
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I: Yeah.
R: ...there is hiccups. We never usually book anything on Monday because if something pops over the weekend. I mean Dougie will normally phone me and say, 'look, we had a problem, you know, something's blown up when I'm out here...
I: Yeah.
R: ...doing this, you know,' at the weekend if there's a breakdown, you know. But I mean it doesn't...it caters for it, they say it does, but it cocks the whole system up, you know.
I: Yeah.
R: But if you want to change the plan, if you get up in the morning and it's raining, you can't do oil work because you can't take oil out in the rain. So you've got to change the game so you've got...'no, okay, we don't do that today, we'll do this.'
I: Yeah.
R: But if they've given you a job card to do that and no alternative, then what?
I: Yeah.
R: Then you could actually say well we've stopped. But it's, it's sometimes...yes, have it electronic, but you still need that guy at the end of the day to make the decision, 'we're going to do that today.' 'Oh sorry, something else has popped, we've got to do this.'
I: Yeah.
R: And those people up in the office can't make that decision.
I: No, they don't have the knowledge and...
R: They don't have the knowledge and they don't know what's going on in the frontline, 'cos they're not in the frontline. They're sitting in the office, and we're the troops in the trenches, you know.
I: Yeah.
R: We can see the thing that's happening, and they can't, you know.
I: Yeah.
R: So they wanted to do all this electronically, you know.
I: Yeah.
R: But it certainly has speeded the whole...I mean I must admit, I mean Tony Surchell[39:12] when he was in charge, he had to write them in by hand, and it all had to go that way, all the way right up to the boss, you know.
I: Yeah.
R: Whereas it's all, it's all pretty quick now, you know.
I: Yeah. Do you use any systems outside of your intranet? For example, if you want to find something out, like using the internet. Do you use the internet at all?
R: No, I don't have internet connection, but...
I: Do you not?
R: ...I didn't ask for it. Most of the transmissions guys in planning have it 'cos they have to...if they want to look for stuff, er, but I haven't got an internet connection outside.
I: So how would you use that for your, for your job? What would you see the...
R: I suppose it'd be handy if I wanted to go and physically look for something, you know. But because over the years you've built up contacts, you know who to contact in your...you're limited with what companies can do things in South Africa.
I: Yeah.
R: Erm, obviously these guys are dealing with manufactures overseas, I mean we buy stuff from Italy, we buy stuff from China. So they, they look at all that stuff, you know...
I: Yeah.
R: ...what they can give us. Er, and the likes of the gas turbine has a 12 million Rand overhaul. And the guy's out from England for six weeks, and they done the overall. But I mean the guys had to communicate with people in England, and they had to go England to see all the bits and pieces that were getting made for it, you know. So that type of stuff, so they've obviously communicated a lot of stuff...
I: Yeah.
R: ...er, over the internet with that, sending pictures and all sorts of data and stuff, you know.
I: Yeah.
R: Er, and obviously the cost for the job, you know, all that stuff. So all that stuff was discussed, people went overseas to have a look see, you know. So I'm not really involved in that, I can usually source most of my stuff locally.
I: Yeah.
R: Or I'll just contact the guy locally and say, 'look, we need this, where do we get it?' 'No, we've got to get it from England,' and I'll leave him to do that then. He must go to England, get
Increased Pace
OR combination (standard analysis)
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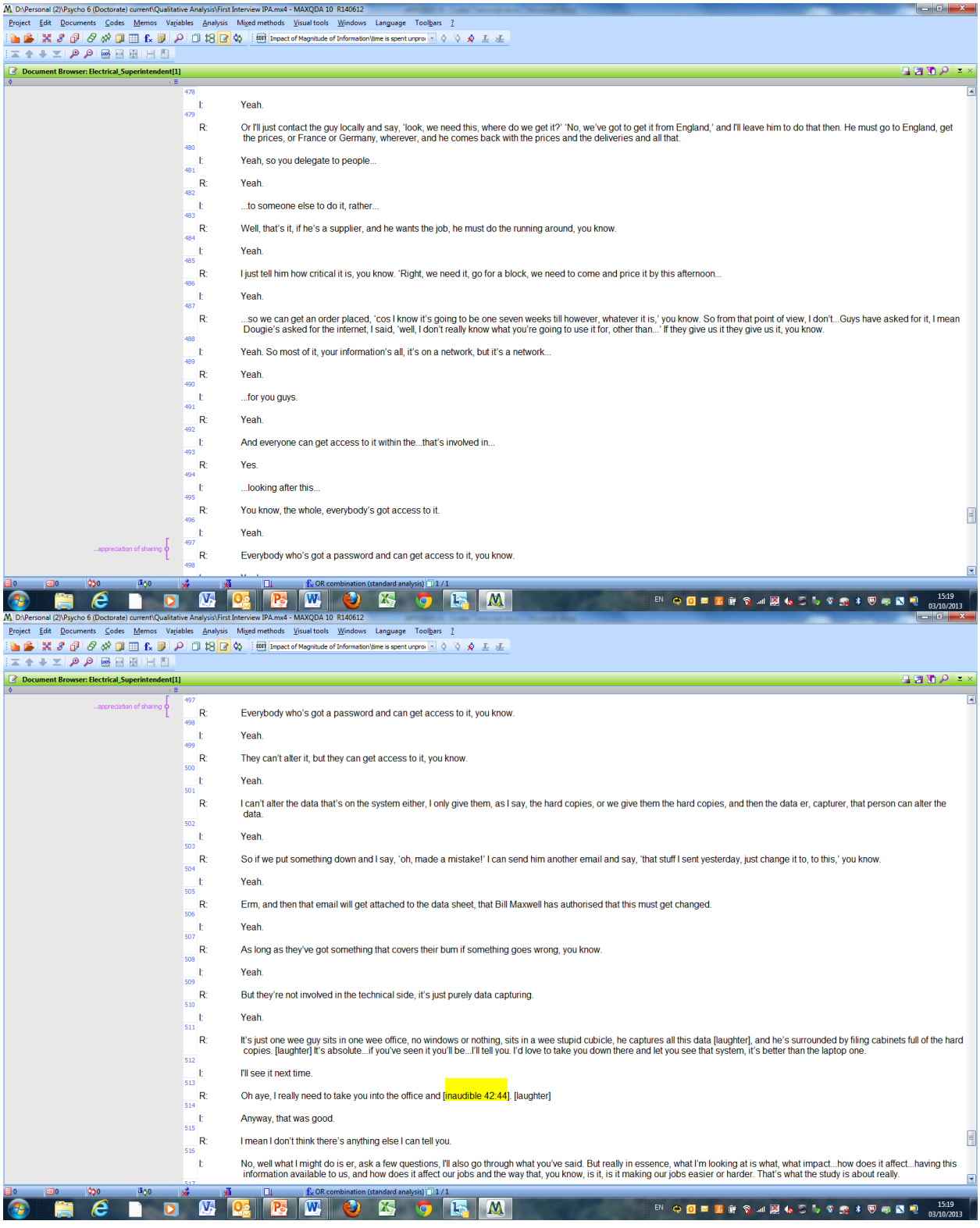
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478 I: Yeah.
479 R: Or I'll just contact the guy locally and say, 'look, we need this, where do we get it?' 'No, we've got to get it from England,' and I'll leave him to do that then. He must go to England, get the prices, or France or Germany, wherever, and he comes back with the prices and the deliveries and all that.
480 I: Yeah, so you delegate to people...
481 R: Yeah.
482 I: ...to someone else to do it, rather...
483 R: Well, that's it, if he's a supplier, and he wants the job, he must do the running around, you know.
484 I: Yeah.
485 R: I just tell him how critical it is, you know. 'Right, we need it, go for a block, we need to come and price it by this afternoon...
486 I: Yeah.
487 R: ...so we can get an order placed, 'cos I know it's going to be one seven weeks till however, whatever it is,' you know. So from that point of view, I don't...Guys have asked for it, I mean Dougie's asked for the internet, I said, 'well, I don't really know what you're going to use it for, other than...' If they give us it they give us it, you know.
488 I: Yeah. So most of it, your information's all, it's on a network, but it's a network...
489 R: Yeah.
490 I: ...for you guys.
491 R: Yeah.
492 I: And everyone can get access to it within the...that's involved in...
493 R: Yes.
494 I: ...looking after this...
495 R: You know, the whole, everybody's got access to it.
496 I: Yeah.
497 ...appreciation of sharing
R: Everybody who's got a password and can get access to it, you know.
OR combination (standard analysis) 1 / 1
15:19 03/10/2013
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Project Edit Documents Codes Memos Variables Analysis Mixed methods Visual tools Windows Language Toolbars ?
Document Browser: Electrical_Superintendent[1]
497 ...appreciation of sharing
R: Everybody who's got a password and can get access to it, you know.
498 I: Yeah.
499 R: They can't alter it, but they can get access to it, you know.
500 I: Yeah.
501 R: I can't alter the data that's on the system either, I only give them, as I say, the hard copies, or we give them the hard copies, and then the data er, capturer, that person can alter the data.
502 I: Yeah.
503 R: So if we put something down and I say, 'oh, made a mistake!' I can send him another email and say, 'that stuff I sent yesterday, just change it to, to this,' you know.
504 I: Yeah.
505 R: Erm, and then that email will get attached to the data sheet, that Bill Maxwell has authorised that this must get changed.
506 I: Yeah.
507 R: As long as they've got something that covers their bum if something goes wrong, you know.
508 I: Yeah.
509 R: But they're not involved in the technical side, it's just purely data capturing.
510 I: Yeah.
511 R: It's just one wee guy sits in one wee office, no windows or nothing, sits in a wee stupid cubicle, he captures all this data [laughter], and he's surrounded by filing cabinets full of the hard copies. [laughter] It's absolute...if you've seen it you'll be...I'll tell you. I'd love to take you down there and let you see that system, it's better than the laptop one.
512 I: I'll see it next time.
513 R: Oh aye, I really need to take you into the office and [inaudible 42:44]. [laughter]
514 I: Anyway, that was good.
515 R: I mean I don't think there's anything else I can tell you.
516 I: No, well what I might do is er, ask a few questions, I'll also go through what you've said. But really in essence, what I'm looking at is what, what impact...how does it affect...having this information available to us, and how does it affect our jobs and the way that, you know, is it, is it making our jobs easier or harder. That's what the study is about really.
OR combination (standard analysis) 1 / 1
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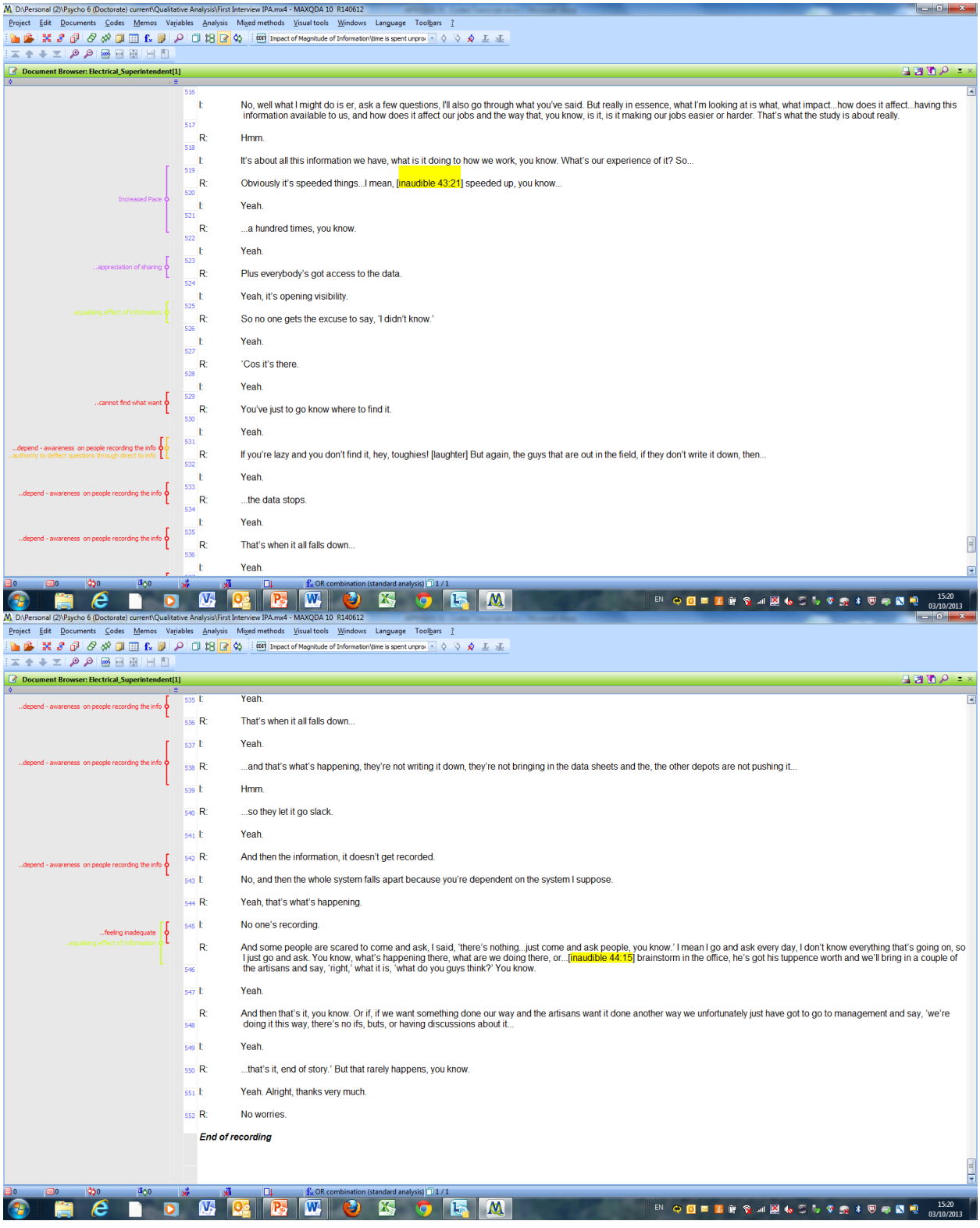
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516 I: No, well what I might do is er, ask a few questions, I'll also go through what you've said. But really in essence, what I'm looking at is what, what impact...how does it affect...having this information available to us, and how does it affect our jobs and the way that, you know, is it, is it making our jobs easier or harder. That's what the study is about really.
517 R: Hmm.
518 I: It's about all this information we have, what is it doing to how we work, you know. What's our experience of it? So...
519 R: Obviously it's speeded things...I mean, [inaudible 43:21] speeded up, you know...
Increased Pace
520 I: Yeah.
521 R: ...a hundred times, you know.
522 I: Yeah.
..appreciation of sharing
523 R: Plus everybody's got access to the data.
524 I: Yeah, it's opening visibility.
..equalising effect of information
525 R: So no one gets the excuse to say, 'I didn't know.'
526 I: Yeah.
527 R: 'Cos it's there.
528 I: Yeah.
..cannot find what want
529 R: You've just to go know where to find it.
530 I: Yeah.
..depend - awareness on people recording the info
..authority to deflect questions through direct to info
531 R: If you're lazy and you don't find it, hey, toughies! [laughter] But again, the guys that are out in the field, if they don't write it down, then...
532 I: Yeah.
..depend - awareness on people recording the info
533 R: ...the data stops.
534 I: Yeah.
..depend - awareness on people recording the info
535 R: That's when it all falls down...
536 I: Yeah.
OR combination (standard analysis) 1 / 1
15:20 03/10/2013
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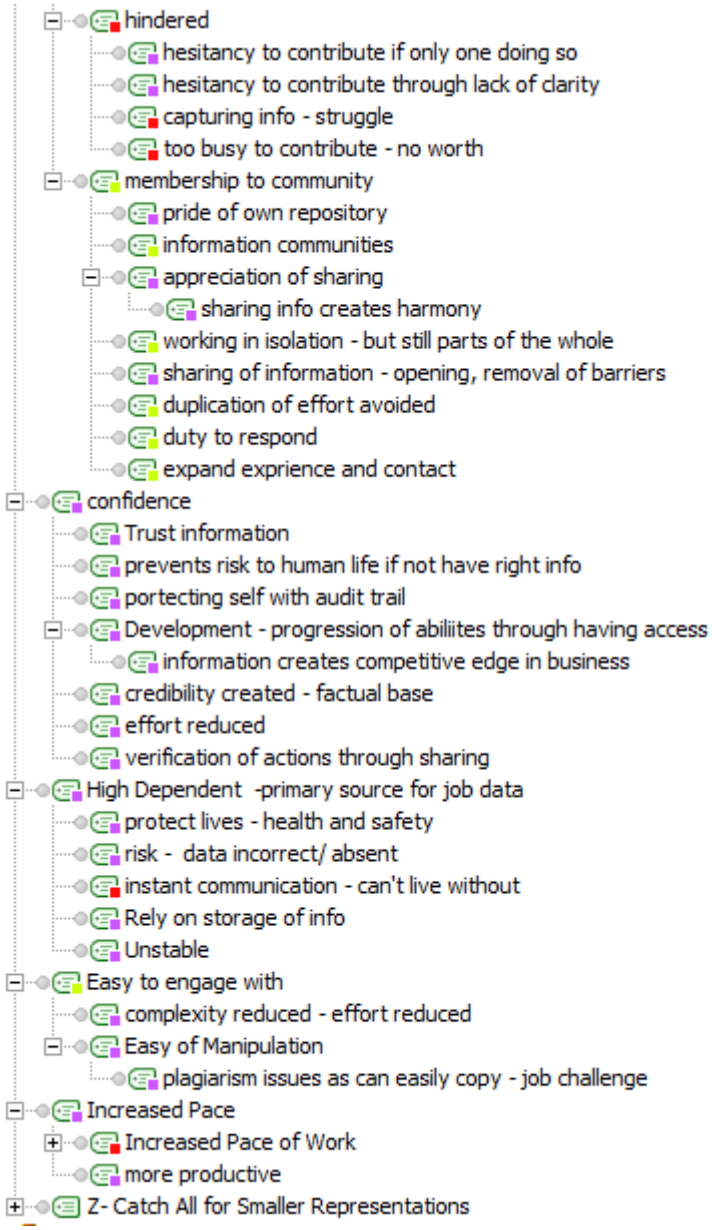
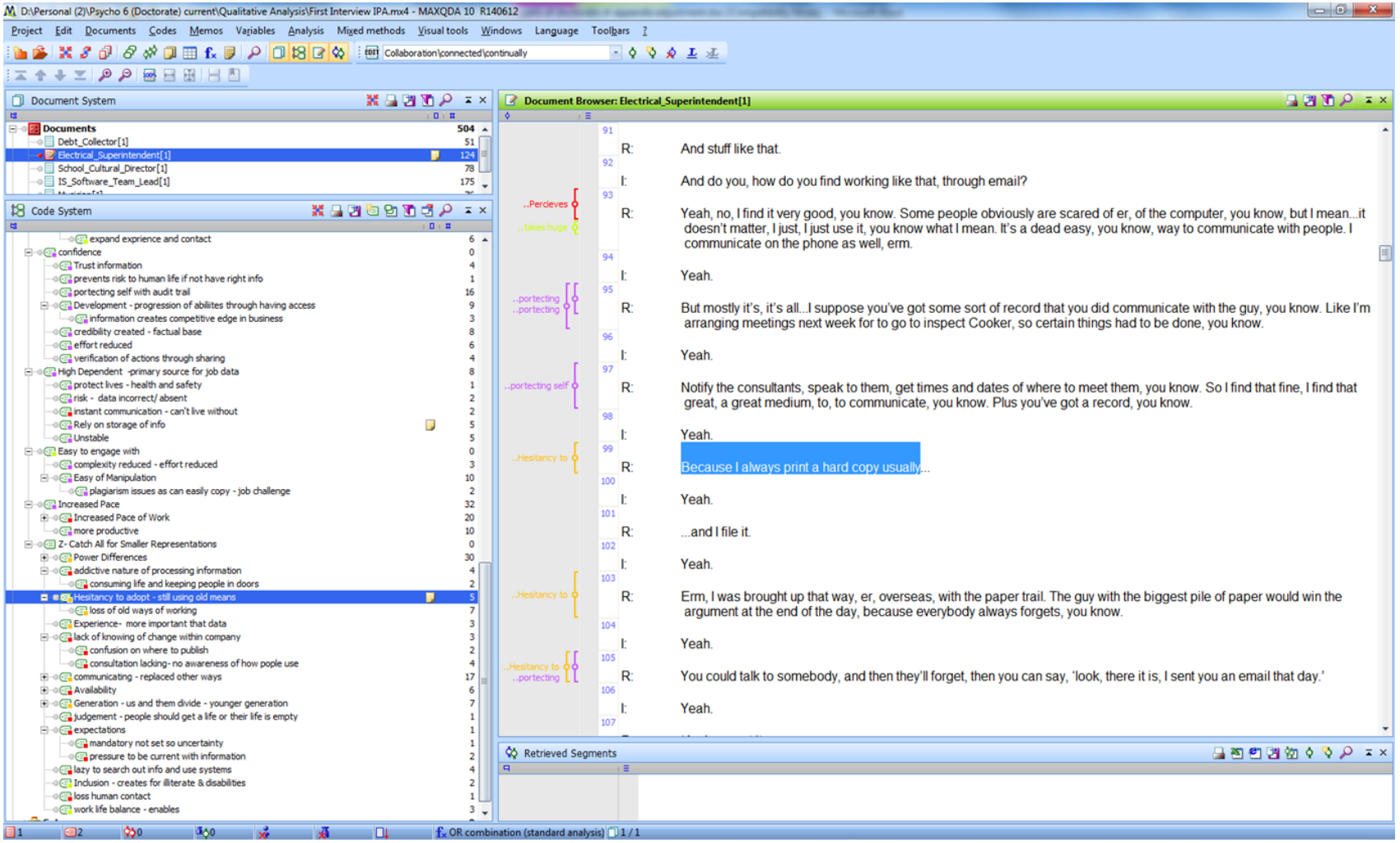
Project Edit Documents Codes Memos Variables Analysis Mixed methods Visual tools Windows Language Toolbars ?
Document Browser: Electrical_Superintendent[1]
..depend - awareness on people recording the info
535 I: Yeah.
536 R: That's when it all falls down...
537 I: Yeah.
..depend - awareness on people recording the info
538 R: ...and that's what's happening, they're not writing it down, they're not bringing in the data sheets and the, the other depots are not pushing it...
539 I: Hmm.
540 R: ...so they let it go slack.
541 I: Yeah.
..depend - awareness on people recording the info
542 R: And then the information, it doesn't get recorded.
543 I: No, and then the whole system falls apart because you're dependent on the system I suppose.
544 R: Yeah, that's what's happening.
..feeling inadequate
..equalising effect of information
545 I: No one's recording.
R: And some people are scared to come and ask, I said, 'there's nothing...just come and ask people, you know.' I mean I go and ask every day, I don't know everything that's going on, so I just go and ask. You know, what's happening there, what are we doing there, or...[inaudible 44:15] brainstorm in the office, he's got his tuppence worth and we'll bring in a couple of the artisans and say, 'right,' what it is, 'what do you guys think?' You know.
546
547 I: Yeah.
R: And then that's it, you know. Or if, if we want something done our way and the artisans want it done another way we unfortunately just have got to go to management and say, 'we're doing it this way, there's no ifs, buts, or having discussions about it...
548
549 I: Yeah.
550 R: ...that's it, end of story.' But that rarely happens, you know.
551 I: Yeah. Alright, thanks very much.
552 R: No worries.
End of recording
OR combination (standard analysis) 1 / 1
15:20 03/10/2013

APPENDIX K

MAXQDA CODED THEMES


hindered
hesitancy to contribute if only one doing so
hesitancy to contribute through lack of clarity
capturing info - struggle
too busy to contribute - no worth
membership to community
pride of own repository
information communities
appreciation of sharing
sharing info creates harmony
working in isolation - but still parts of the whole
sharing of information - opening, removal of barriers
duplication of effort avoided
duty to respond
expand exprience and contact
confidence
Trust information
prevents risk to human life if not have right info
portecting self with audit trail
Development - progression of abiliites through having access
information creates competitive edge in business
credibility created - factual base
effort reduced
verification of actions through sharing
High Dependent -primary source for job data
protect lives - health and safety
risk - data incorrect/ absent
instant communication - can't live without
Rely on storage of info
Unstable
Easy to engage with
complexity reduced - effort reduced
Easy of Manipulation
plagiarism issues as can easily copy - job challenge
Increased Pace
Increased Pace of Work
more productive
Z- Catch All for Smaller Representations

APPENDIX L - MAXQDA FLEXIBLITY OF USE



APPENDIX M

FULL EXPORT FROM MAXQDA OF ALL THEMES

SUPER-ORDINATE	SUB-ORDINATE	Further Sub-Categories
Wonder at Magnitude of Change		
	accessibility of a new untapped world	
Impact of Magnitude of Information		
	increased concentration	
	time is spent unproductively chasing data	
	vastness of data recognised	
	feeling of overwhelmed by data/ distracted	
	Enabling	
Challenges - potential stress - new mental challenges created		
	Finding things	
		finding difficult creates doubt lack engagement
		cannot find what want
		search engine disappointing effort back on people
	Distracts due to currency issues	
	Inadequate skills to use data	
		Perceives others fearful of computers
		feeling inadequate
		at people not using inputted information
	Interrupts Focus - flow of work as information comes in	
	Training - not as effective on intranet	
	Education slowed - concept of knowledge changing	
Collaboration		
	connected	
		Need to know what is going on
		inclusion - need to be part of information processing
		disconnected means lack of control
		more able to be connected - enhances ability
		continually
		engage completely or not at all - on or off
		enables connections to other human minds - understanding
		pulled into connection
	Contribution	
		Contribution - should be structured
		depend - awareness on people recording the info
		hesitancy to engage as disliked doing extra effort
		limited - just searching - key activity
		Motivating and ensuring enter information
		effort to make data work
		awareness of others doing it
		untrusting of excuses not to respond
		not engaged with giving back to data
		feel nothing new to offer - personal
	hindered	

		hesitancy to contribute if only one doing so
		hesitancy to contribute through lack of clarity
		capturing info - struggle
		too busy to contribute - no worth
	membership to community	
		pride of own repository
		information communities
		appreciation of sharing
		working in isolation - but still parts of the whole
		sharing of information - opening, removal of barriers
		duplication of effort avoided
		duty to respond
		expand experience and contact
confidence		
	Trust information	
	prevents risk to human life if not have right info	
	protecting self with audit trail	
	Development - progression of abilities through having access	
		information creates competitive edge in business
	credibility created - factual base	
	effort reduced	
	verification of actions through sharing	
High Dependent -primary source for job data		
	protect lives - health and safety	
	risk - data incorrect/ absent	
	instant communication - can't live without	
	Rely on storage of info	
	Unstable	
Easy to engage with		
	complexity reduced - effort reduced	
	Easy of Manipulation	
		plagiarism issues as can easily copy - job challenge
Increased Pace		
	Increased Pace of Work	
		Reflect difficult in old ways of working
		from company to be comfortable with system just ca
		to process data faster due to machines bringing it
		of fast response time from information sent
	more productive	
Z- Catch All for Smaller Representations		
	Power Differences	
		restricted view of information sharing - power in knowledge
		Power - enforced contribution
		equalising effect of information
		withhold info - hoarding
		authority to deflect questions through direct to info
	addictive nature of processing information	
		consuming life and keeping people in doors
	Hesitancy to adopt - still using old means	
		loss of old ways of working
	Experience- more important that data	

	lack of knowing of change within company	
		confusion on where to publish
		consultation lacking- no awareness of how people use
	communicating - replaced other ways	
		takes huge effort out of
		enables less spoken word that is preferable
		anonymity - good to have less interaction
		replaced talking
	Availability	
		Quick fix society - easy route to achieve goals
		Moral issue of taking what is free
		too easy and free
	Generation - us and them divide - younger generation	
		future direction of digital information recognised
		Disassociation based on technology differentiator
		Generation - Unthreatened by digitally aware
	judgement - people should get a life or their life is empty	
	expectations	
		mandatory not set so uncertainty
		pressure to be current with information
	lazy to search out info and use systems	
	Inclusion - creates for illiterate & disabilities	
	loss human contact	
	work life balance - enables	

REFLECTION

Undertaking this research project and, indeed, deciding to do a doctorate degree had been a personal goal for mine since I started studying psychology in 1996. When I completed my Masters, my sights were set on the last hurdle to 'jump' before I achieved my ultimate goal. However, the path was not a straight one as it ran alongside my career in IT, and in some cases was at odds with it. However, each challenge I faced provided me with a new perspective on the world and on myself. As William Frederick Halsey said:

> *'There are no great people in this world, only great challenges which ordinary people rise to meet.'*

This encapsulates how I feel about myself and the abilities of humanity as a whole. I am no great person and I possess no fantastic gifts in life. However, within myself I felt I was capable of completing a doctorate. I have always felt that education is about a process, and doing research at this level requires tremendous drive. In this reflective piece I hope to explain some of the motivations and development points gained from this research project. Hopefully, this will provide some reflexivity for the work. Let me start with my motivations for this particular piece of research.

Personal Motivation for Study

If I describe myself, I would say that I seek to achieve a sense of eudemonic well-being in my life through the application of my practical skills and emotional

perception. I have always volunteered in fields where sensitivity and expertise were required. For example, from age 14 years old I was a member of St John's Ambulance, the Red Cross, then as an emergency paramedic on the ambulance service working in accident and emergency units in South Africa. Currently, I volunteer in mental health, drug and alcohol addiction as a qualified counsellor. My aims are altruistic and focused on improving others experience of life. My first qualification was, however, in Information Technology. I was a data designer, working with various system data requirements to design efficient systems for usage in business. My second set of qualifications was in psychology. Eventually, the two fields came together in my masters, and now in my doctorate in occupational psychology.

My core motivation has been, and still is, to improve people's lives. In this study it is aimed at improving the experience of type of information systems that I have orchestrated within the workplace. I am fortunate to have worked before and during the 'information age', as you are, if you are reading this. When I started working computer technology did not have a firm hold over our work or personal lives. Then we gradually moved to an age where it became pervasive. When I was a child I did not spend the majority of my time on a computer type device, instead I was playing with real people, not avatars, in the real world. But, things have changed. Children are being exposed to computer technology from birth, most children having a mobile phone by age 7 (Carter, 2013).

From a work perspective I am a technical director within an international organisation. My organisation has revolutionised the way they work with information

and systems in the last few years. They have, as is the case with many organisations, employed more and more technology. The latest being a net-centric portal. I have, as a Director of technicians, questioned the impact of this approach on my staff and the organisation. The portal deployment within the organisation seemed rapid, and from the first day it was launched there was an expectation to 'just' embrace it. As a manager, I wanted to know how this was impacting my teams, and, if the impact was negative, what interventions could be applied to improve the situation.

I also wanted to carry out doctorate in psychology as my next step in my own development. As this was an un-researched area I saw an opportunity to do some real world research that could potentially lead to real work impacts, for me and others. This research interested me as it encapsulated all my training and professional experience into one study. Also, my aim was still to improve people's lives, since we are now surrounded by technology at work. I also considered what was the experience of this kind of technology in other occupations? So, a research proposal started to take shape that had an application within my own line of work, and potentially organisations employing the same approach as my company. The seed of this study was sown.

What Did I Expect to Find

As I was involved as an architect in the building of the information age I do feel responsible to some extent for its impacts on our experience of life. So, as I am motivated to improve the experience of life, and am quite an action orientated person, I hoped that having access to systems and information was not having a

detrimental impact on people's work life. If it was detrimental I wanted to understand to some extent why, so that perhaps I could do something about it within the organisation in which I work. However, from my own experience of technology I understood that things had changed and they were not all for the better. Personally, for example, I ensure that I keep access to such portals to within business hours and do not let my work creep into my personal time, within reason. Also, I had a sense of the frustration I had experienced using technology and my own reliance on its existence to achieve many facets of my job and existence. So, I hoped the experience would be good, but I understood that the experience would not 'all' be good.

Professional Development

The professional development that I gained from conducting this study was immense. I will discuss some of these aspects now.

1.1.1 Using Mixed Methods for the First Time – Triangulation

From a skills viewpoint I used mixed methods for the first time. With this study being my first experience of using mixed methods, I had to understand how to blend or triangulate the data together. This took me some time to understand, and upon reflection I realise that perhaps I could have analysed my data in another way. What I could have done was to re-analyse my qualitative data for the age group that showed particular results. This should perhaps have been a post hoc of the study.

1.1.2 Qualitative – IPA with MAXQDA

From a qualitative standpoint, although I am familiar with understanding people's realities, from my counselling training and work, I had not ever analysed a transcript analysis using software, such as MAXQDA. It was a refreshing experience to see software that not only organised the analysis but also allowed flexibility in terms of reconfiguration of themes while maintaining their related transcript information relationships. Using this software was effective and efficient and it also provided a tangible, transparent and perhaps auditable account of activities as recommended by Smith et al. (2009).

1.1.3 Quantitative SPSS - PROCESS and Interpretation

In terms of doing the quantitative stream of the study, I renewed my understanding of the techniques I have used in the past. However, there was major development here with the discovery of Hayes (2013) PROCESS, as highlighted in the dissertation. Hayes' PROCESS saved much time and opened up a new understanding of moderation and mediation. I also reacquainted myself with SPSS and realised it is much more intuitive than I remembered, as it has been enhanced through software release cycles. I also supported my learning using Field (2013), which I would thoroughly recommend to anyone undertaking quantitative analysis using SPSS. It is well written, humorous and provided me with much step-by-step guidance that took some of the fear away from using SPSS and doing statistical analysis.

As mentioned in my acknowledgements I worked with a good friend of mine who is a statistical expert and it was an incredible developmental point for me to have someone to challenge me and listen to all my 'stupid questions'. Rob also provided me with support in the times that I wanted to 'pull my hair out'. My learning in this

area was that statistics are largely about interpretation, the boundaries being defined in different places by different people. I also realised that I like to work to boundaries and I struggled to work without clear guidelines of interpretation, which caused me some ‘moments of contemplation’ over the statistics. A big learning point for me was that when it comes to tasks I am factually based and I rely on clarity and certainty. I would call this being literal-minded, as I rely on high-standards of proof. I know that this mind-set has always been present to some extent due to my ICT training, but it was enhanced due to a large project I was running that was almost brought before the court, where evidence and audit became paramount. I think this made me seek higher levels of certainty that I previously did not require. I needed to relax this approach as it is not an appropriate approach for life or even the interpretation of statistics, as statistics is about ‘guided interpretation’, rather than being completely steadfast in an approach.

1.1.4 Selection of Existing Scales

When choosing the scales for the quantitative study I sought measures that were relevant, reliable, valid, and had been in existence for some time, some of them decades, and reassessed after many years of usage. However, as the PCA resulted in components that were new, using the measures as intended proved inappropriate. This makes me wonder if I should have launched into the development of my own scale at this stage. I decided not to do this due to the difficult experience I already had in trying to get people to respond to the study. Another factor in this decision was the time involved in the development of a new instrument. It was not my intention to develop an instrument in this doctorate, and so I continued to explore what the data presented to me rather than understand it in terms of existing measures. To me this was truly exploratory research at this point.

1.1.5 Heightened Awareness of Language

Even although I am a practising counsellor, I found that my awareness of language heightened as a result of the qualitative analysis. I am aware that there is a difference between ‘feeling’ what a person is saying when sitting in front of them, and interpreting what is being said through a transcript. When ‘feeling’ in a face to face session, the words are less important. What is important is how things are said. In IPA the words are what you are mainly working with, so the language becomes critical. I think as part of my own continued professional development I may move towards recoding, and transcribing some of my future session, as this will add a further level of understanding to my practice. However, I need to ensure that I release my ‘literal’ state of mind first.

Personal Development

This degree resulted in much personal development. I will now outline some of the areas that come to mind.

1.1.6 Determination and Focus

As I worked on this degree while performing a full time director level job within a large organisation I got a sense of the depths of my dedication and focus. These two things can be beneficial and also detrimental. When doing such a program they are absolutely required. Anyone who is under the impression that doing a doctorate is easy needs to speak to anyone who has achieved it. As my day job is not that of an occupational psychologist, but that of a technical director I felt that I was living two lives and I had to approach my time in slices. This required me to be a director during the working day and a doctoral student the rest of the time. Every minute counted, and I constantly had to remind myself of something Christine Doyle said to

me, which was ‘understand what your goal is with each activity you do in life, big or small’. I applied this question rigorously to my time that was allocated to the study. This task absorbed all the time I had allocated to it, and the last few months of write-up required that I became even more focused in order to finish. Exhaustion inevitably ensued.

Submitting my first draft was a ‘logical’ relief that was not really felt due to the fact that I was still spinning from the intensity of the previous months. So, my reflection is that if I did this again I would be aware of how much effort it takes, especially alongside such a demanding job I have. I would build in some ‘take care of yourself’ time, so that I do not reach the end of the project depleted and in need of intensive rest. But, then again I wonder if it can be better managed in life, as life is full of uncertainties, and if we knew what was in store for us and looked at it rationally, would we ever really do it? Passion is required and a steely determination to push through the challenges, even when exhausted. I have that passion, and I am still standing, even if weary. I am confident that I could do it again, once I forget a little of the pain I have just been through. I would support anyone doing this; it is the highest level of academic development.

1.1.7 Compartmentalisation

With having to run two areas of ‘challenge’ at the same time, both requiring high levels of energy and focus, I needed to develop a coping strategy that enabled me to progress in each area every day. A key consideration was to keep things moving in each, and not to forget tasks or actions for each job. To deal with this I developed a physical strategy and a mental one. My physical strategy was to keep separate work areas for my different jobs. This led to my having two tables, or a desk and a table,

each being used for a different purpose. One table was related to my day job and the other table was for research. This allowed me to have environments and folders that kept things separate. On each table I would have a ‘To Do’ List and everything I needed to do I would track via this list. I also ensured that when I had an idea about the area I was not working on at that moment, I would write it down so that I did not have to worry about forgetting things.

On the mental side I came up with the concept of two folders in my head. During the day I would process and package my work day straight after work into the work folder and action a ‘mental close’ on this. Then I would open the doctorate folder. This idea may sound odd, but it really worked for me. I called it compartmentalisation of my work realities. This strategy became so effective for me that if someone asked me in the evening what I had done at work today, I would actually have to think hard to access my normal business day to reopen the folder. And I must admit I did not like when I had to reopen the folder after normal working hours were over. It was quite a visual way of keeping the work contained and it also helped me deal with the problems of my research leaking into my working day. I felt tasks were safe, in holding, until I was ready to address them in the next research slot.

1.1.8 Coping with Stress and Fatigue

I have learned from my masters that research can be encompassing if it is let to run wild in one’s life. Indeed it can keep a person up at night and that just compounds the problem of stress. In order to combat stress I protected the majority of my weekends in order to recover from the busy working and researching week. I knew that if I worked a weekend, or after ten thirty in a week evening, that I would experience burn-out. I disciplined myself not to do this, but instead to focus on life at

the weekends and get a break from the pressures I would put myself under during the week. This strategy worked well. Also, I become quite sensitive to when I was fatigued in the evenings or mornings and I would at this point take a short break, walk in the garden. A cup of tea cleared my head and allowed me to come back to the task and understand what I had been struggling with. I also tried to keep my goals reasonable as I knew that if I set goals that I would not achieve, then I would become disheartened. Of course I did experience stress and needed a friendly shoulder for some support now and again. If I did this research again I would probably employ the same strategy, perhaps with a little more exercise and more vitamins.

Professional Practise Development

There are a number of areas of development that I will now explore related to professional practice.

1.1.9 Running a Research Project

In conducting the study I have improved my practice as a psychologist. I have run large projects before; however, these have been in ICT and not in research. I now have an excellent grasp of the mechanics of such projects, the pitfalls, sequence of events, who needs to be involved, and the risks. Within the mind-set of a project manager, which I already have as part of my ICT training, I can superimpose the requirements of research. I feel that I would be more confident to run such a project in future. Yes, I would run it differently from this project, as in this one I was finding my feet. I may for example not run the studies in parallel, but do the qualitative one first as it was freer to explore the phenomenon. Or I may have revisited the

qualitative, as explained, after I realised that the age group with the most significant results in the quantitative study were made up of half of my qualitative sample. I would probably have involved more people in a discussion of the findings from the qualitative results, as every person I discuss this research with has some ideas why the results exist. But, overall I feel I have a good grasp of a research project, and could do a better job of it next time.

1.1.10 Being a Pragmatist

In methodological terms I feel that I will always be a pragmatist. I enjoy a bit of philosophy, perhaps more than most, as I have a major in philosophy from my first degree. But as I am action orientated I like to keep my feet on the ground and moving in the right direction. I think that epistemology is not a core concern of practicing psychologists but a field for purists. People are multifaceted, and so should be the tools that we employ to understand our realities.

1.1.11 Studying Your Own Organisation

This study had a number of challenges in achieving approval. Upon reflection, if the study were to be conducted again the initial approach may have been modified. The organisation in question went through change in both structure and management during the study. Sometimes, it seems like an easy thing to do, to run a study within an organisation in which you work. However, I would caution anyone to do this unless you have been commissioned to run such a study and you have executive sponsorship. In my case the software was present for me to use, the staff were also there and so was the net-centric system. Also, I wanted to understand the impact of the portal on my staff so that I could shape it accordingly to improve any negative outcomes. So, it made sense to run it within the organisation in which I worked.

However, running a study that is not part of the ‘day job’ raises questions, and I had to be clear of my motivations for the study, and that they were aligned with my job role and the organisations direction. The concept of positioning research into the business landscape is an important one in order to motivate acceptance to do a study. However, a note of caution should be exercised here about setting expectations. In the case of exploratory research such as I was conducting, the outcomes are not certain, and thus, neither are the implications or resultant interventions. So, positioning in business terms is a must, but I needed to be careful not to pre-suppose the outcome or potential return on investments as these were completely unknown.

I also think that I should have perhaps approached another organisation in order to run the questionnaire in parallel, as this would have increased the generalizability of the study. However, as I was a director in a company I am not certain as to how this could have been positioned without causing an ethical challenge. I could not have approached another company in the same line of business as the company I worked for. If I approached another large company my motives may have been questioned as my company works with most other large organisations. So, studying my own company probably was the best outcome.

1.1.12 IPA Audit

Regarding the IPA I think it would have been a good practice to employ some auditing during the process. I did ask one of my editors to check my interpretation of the transcript quotations and they did give me some feedback. However, I think that it would have been a better approach to check these with someone who knew the

approach, as indeed I did with the statistics with Rob. But alas, I did not have anyone as kind as Rob to help that was an expert in IPA. Next time I would seek some assistance.

1.1.13 Reiterations of IPA Analysis

Knowing when to stop in an IPA analysis is, I think, a matter of experience. I went through a number of iterations and configurations of super-ordinate themes to subordinate themes, which in the end felt like I was playing with a Rubik's cube with a changing pattern. I did however have to keep reminding myself that I was answering a research question and this brought me back on track. I would make sure I asked myself the research question and put it up in my office near my screen in future.

I also keep asking myself what I could have done to further triangulate the data. The main thing that I came up with, and if I had more time I would do, is a post hoc, to explore the ages of significance from the quantitative data. As 50 per cent of the sample was in the right age category that has significant relationships from the quantitative study, it may have been interesting to run the quantitative first then explore with the qualitative. However, as this study was exploratory this approach may have hindered taking an IPA approach as it would have focused on specific experience of variables and not a wider phenomenon. I was interested in laying a foundation to exploring the research question, so the study had to remain at this level of investigation, and not be restricted to a set of variables.

Conclusion

Overall, doing this research made me really think about myself, technology and psychological practice. It expanded what I know about technology and its pervasive effects on people and now I look at the world of technology differently. I hope that I have put a new leaf on one of the trees in the expanding forest of research, and that my findings will cause others to think. This study has certainly caused me to think, and now I have even more questions than before.